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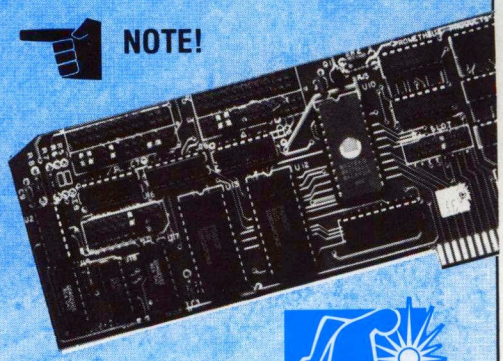

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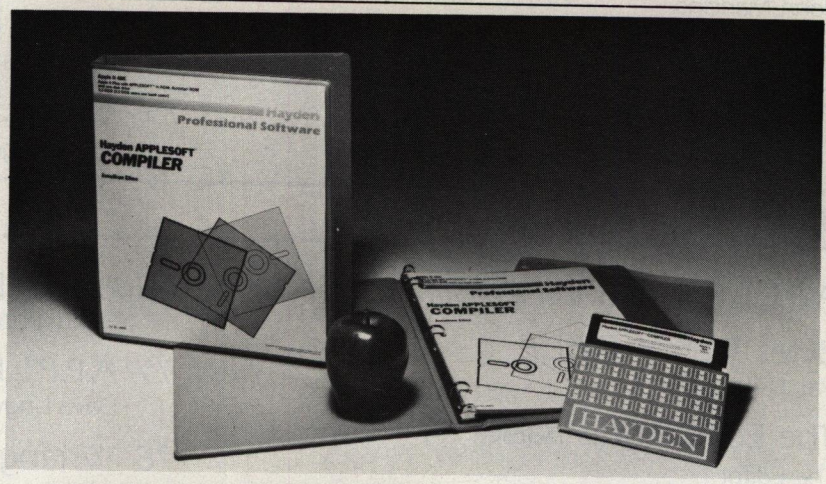

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THE EDITOR BYTES BACK

By The Editor

JANUARY has arrived (at least for our readers), and with it, the first of our monthly issues of *Call -A.P.P.L.E.* Many have wondered why we had settled on a publication schedule of nine issues per year, and the answer is simplicity itself: in the earliest period, we never had the time to meet a monthly deadline. The magazine (newsletter then) was a one man operation, and as an issue became later and later, we just changed the cover date to reflect a two month period. As we commence our fifth year of publication, we begin monthly publication. *Call -A.P.P.L.E* will be mailed (approximately) on the first day of the month appearing on the cover.

One other frequently asked question that should be addressed is: *"Why does my dealer get his copies a week or more before I do?"* The magazine is mailed in the following order, over a period of just under a week:

1.) to first class and foreign members
2.) by bulk mail to the majority of our members, and
3.) by United Parcel to our dealers

Along the way, though, UPS overtakes Uncle Sam, and copies arrive at the dealers first. Third Class (bulk rate) mail takes anywhere from one to three or more *weeks* to find its way across the U.S.

Onward to wishing you the best for 1982, and with it, we bring you from the *Very Core of Apple* a pair of cover features: **C. K. Mesztenyi's** paper exploring *Applesoft Internal Structure,* and some notes by our European consultant, **Cornelis Bongers,** *The $48 Trap,* which explains a DOS bug that causes occasional system crashes.

Following hard behind, *Exploring the World of Apple* is hosted by returning author **Lou Infeld** with some layman-oriented discussion of how the disk directory works with his *Get File Information Subroutine,* which will show you how to get a catalog into RAM memory.

Concluding our headline stories, Staff Writer **Ralph Swerdlow** pens another chapter of *A is for Apple,* presenting a simple *Check Book Balancer.*

Working away from some of the heavy stuff, lower case adaptor designer **Dan Paymar** offers some advice on *Selecting a Disk System,* **John Mancino** has his *Visi /// Utility,* of interest to Apple /// Visicalc users, **Charles Rusch** returns with his popular *Notes from a Novice,* and his topic this month is how to modify the Apple Pie word processor commands so they make sense.

Another regular feature included in this issue is **Henry Roberts'** *A.P.P.L.E. Doctor* rounding out the half dozen other items of interest found on page 3. So dig in and enjoy.

February, we hope, will include the long delayed special section on printers, a feature on the Apple video text buffer, and the return of our *magnum opus* Word Processor Evaluations.

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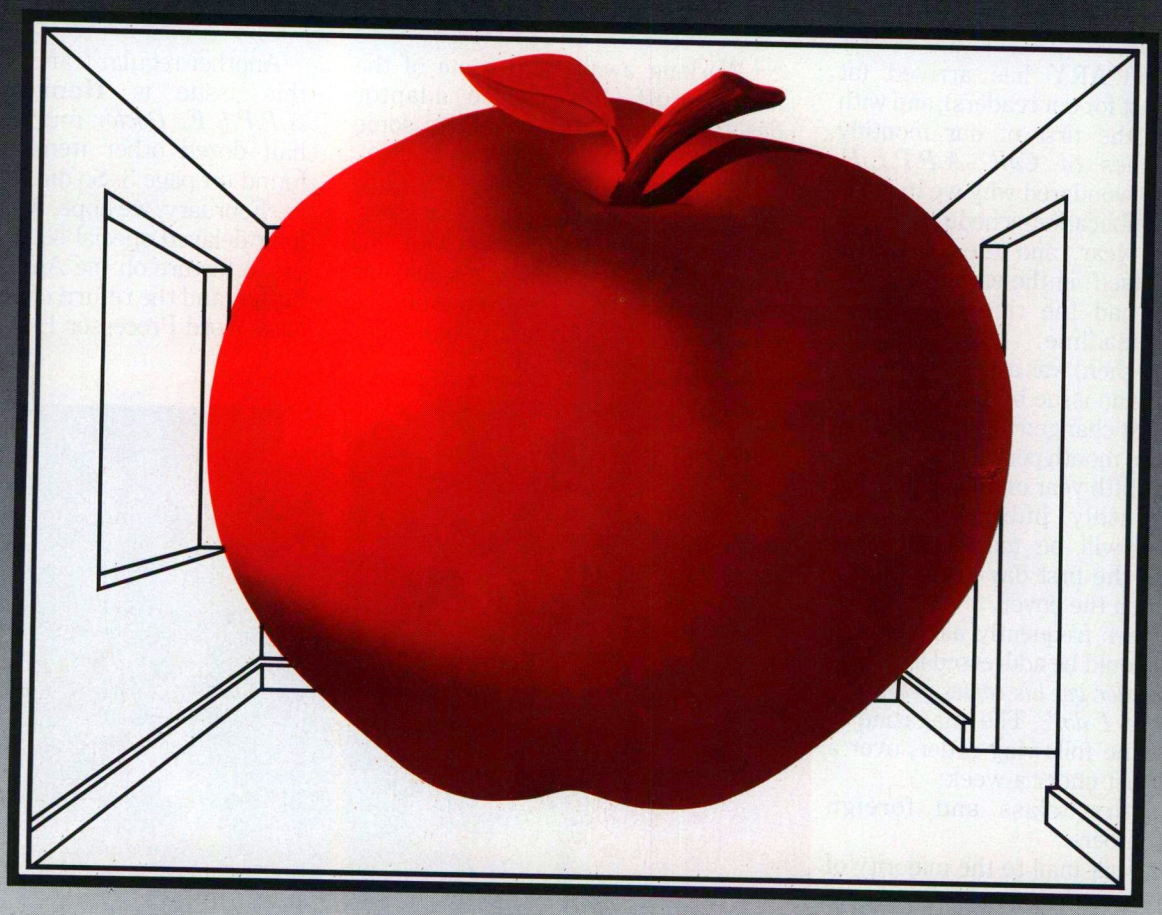

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BYTES FROM A.P.P.L.E.

By Val J. Golding

FOR January we'd like to start with a reminder: when you order one of our new products at a special or pre-release price, the product(s) may not be available exactly when we thought it would be, and if one is available and the other is not, we will hold the order until both products are ready. This is why we offer you some super savings on these items, and for that reason, we need to be able to avoid paying two or more separate shipping charges. *We therefore recommend that you order products at pre-release prices separately from other items.*

Symbol Symon is the first of our four new releases for this month. We anticipate being able to ship about Feb. 1. Symon is a complete assembly language symbolic debugging package which works with symbol tables from Big Mac, Ted][+, and the DOS Tool Kit, or object code from any other assembler. It has automatic break point insertion and deletion, step and trace with COUT simulation and binary register displays. It will sell for $20.

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Symbol Symon and Big Mac appear to be perfect traveling companions, so until Feb. 28th, we will offer the **Symbol Symon Special,** both programs, including over 100 pages of documentation, for just $42.50, a $5 savings.

With 1982 at hand, we have again put together a collection of the nine 1981 Call —A.P.P.L.E. issues, three-ring binder punched, added a new outer cover, and prepared a complete index. This volume will sell for $20, with a member price of $18.50. Now to turn this into another dollar-saver, we will package it with anthology diskettes 5 and 6, which cover 1981, and regularly sell for $12.50 each. The Anthology diskettes contain programs from Call —A.P.P.L.E. which cover a six month period each. We'll call this the **1981 Special** and offer it for $37.50, which is a reduction of $6 from the individual prices. This should be out about February 1st, and is the perfect way to start your back issue collection.

(continued on page 79)

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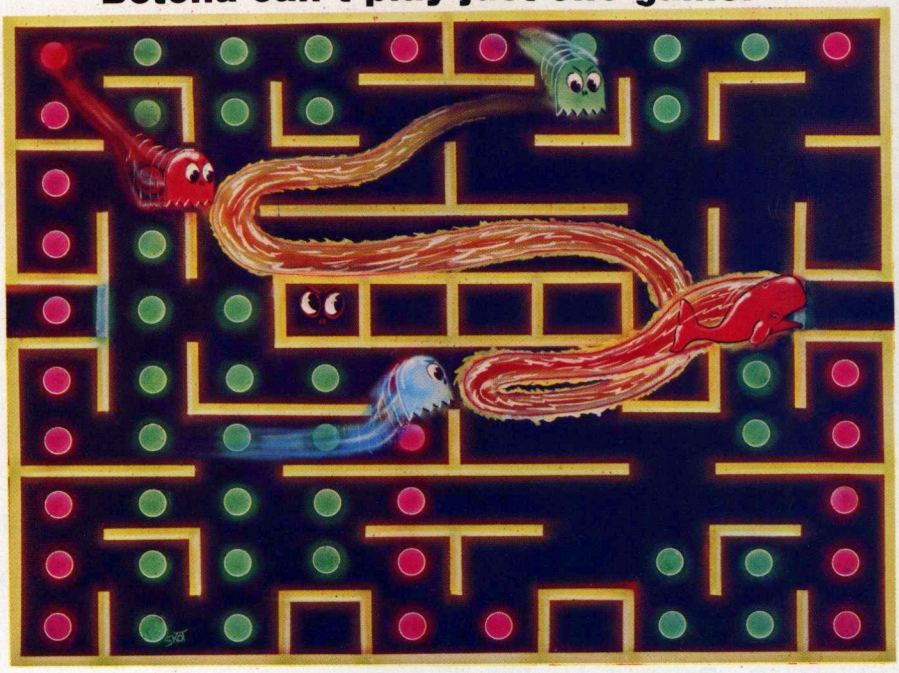

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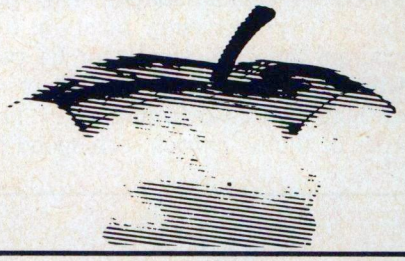
FROM THE VERY CORE OF APPLE:

Applesoft Internal Structure



By C.K. Mesztenyi/Washington Apple Pi

INTRODUCTION

THIS article attempts to describe the overall structure of Applesoft in the ROM space $D000-F7FF; it may be considered as a preceding chapter to "Applesoft Internals," hereinafter referred to as "Crossley", and gives descriptions of many subroutines and zero page usage. Crossley and other abbreviated references, known herein by Lingwood, Mesztenyi and Golding, may be found at the conclusion of this article.

Before going into details, I must define certain terms for the sake of this article which may be very confusing in the Applesoft Manual. These terms are the "statement," "command," "instruction," "line number" and "line." The first three of these are used somewhat interchangeably in the Manual. It refers to REM and Assignment or LET statements in Chapter 1, lists them as Commands together with ABS in Appendix O, and assumes them to be instructions in Chapter 2 and Appendix N. I do not intend to clear all these confusions and errors in the syntactic definition and subsequently used terminology. instead, the following syntactic definitions will be used here with the hope that I will not confuse the issue further. These definitions are as follows:

statement	:= end-st / for-st/ / ... / new-st
let-st	:= assign-st / LET assign-st
compound-statement	:= statement [CR] statement :
labeled-statement	:= linenumber compound-statement

For example, I define a "statement" as any of the 64 statements with the keyword "end," "for,"... as listed in the keyword column of the Statement Type Entry Table; the syntactic rules of these individual statements are given in the Manual under their descriptions. The compound-statement is a list of [simple] statements separated by a ":", while the labeled-statement is a line number followed by the compound-statement which the Manual defined as "line." [CR] stands for carriage return.

With these definitions, one can state that a compound-statement is a program in immediate mode, while a labeled-statement is a program part in deferred mode.

1. DATA STRUCTURE

The data areas used by Applesoft reside:

1. Flags and temporaries on Zero page.
2. Five Tables in memory $D000-D364.
3. Scattered (locally used) data interspersed in the program area $D365-F7FF.
4. Zero page load data in memory $F10B-F126.
5. Stored program normally from memory address $0801.
6. Variable areas.

1.1 Zero Page

The zero page use is described in (Applesoft, Basic Programming Reference Manual pp.140-141). Further information may be found in [Crossley], [Mesztenyi], and [Lingwood].

1.2 Tables

The five tables residing in $D000-D364 are as follows:

$D000-D07F = Statement Type Entry Table.
$D080-D0B1 = Function Entry Table.
$D0B2- D0CF=Operator Tag and Entry Table.
$D0D0- D25F=Keyword Token Table.
$D260-D364 = ASCII Messages.

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APPLESOFT INTERNAL STRUCTURE

The Statement Type Entry Table is used to recognize statements and to obtain the proper entry points in the program area. It consists of 64 two byte entries containing the entry point low-high addresses minus one. The order of the 64 entries correspond to the tokens, 128 to 191, assigned to the keywords END to NEW, as given in (Applesoft, Basic Programming Reference Manual, p.121). Table 1 summarizes these data, giving the actual entry point addresses.

TABLE 1
Statement Type Entry Table From $D00-D07F

Hex Token	Key Word	Entry Point	Hex Token	Key Word	Entry Point
$80	END	$D870	$A0	COLOR=	$F24F
$81	FOR	$D766	$A1	POP	$D96B
$82	NEXT	$DCF9	$A2	VTAB	$F256
$83	DATA	$D995	$A3	HIMEM:	$F286
$84	INPUT	$DBB2	$A4	LOMEM:	$F2A6
$85	DEL	$F331	$A5	ONERR	$F2CB
$86	DIM	$DFD9	$A6	RESUME	$F318
$87	READ	$DBE2	$A7	RECALL	$F3BC
$88	GR	$F390	$A8	STORE	$F39F
$89	TEXT	$F399	$A9	SPEED=	$F262
$8A	PR#	$F1E5	$AA	LET	$DA46
$8B	IN#	$F1DE	$AB	GOTO	$D93E
$8C	CALL	$F1D5	$AC	RUN	$D912
$8D	PLOT	$F225	$AD	IF	$D9C9
$8E	HLIN	$F232	$AE	RESTORE	$D849
$8F	VLIN	$F241	$AF	&	$03F5
$90	HGR2	$F3D8	$B0	GOUB	$D921
$91	HGR	$F3E2	$B1	RETURN	$D96B
$92	HCOLOR=	$F6E9	$B2	REM	$D9DC
$93	HPLOT	$F6FE	$B3	STOP	$D86E
$94	DRAW	$F769	$B4	ON	$D9EC
$95	XDRAW	$F76F	$B5	WAIT	$E784
$96	HTAB	$F7E7	$B6	LOAD	$D8C9
$97	HOME	$FC58	$B7	SAVE	$D8B0
$98	ROT=	$F721	$B8	DEF	$E313
$99	SCALE=	$F727	$B9	POKE	$E77B
$9A	SHLOAD	$F775	$BA	PRINT	$DAD5
$9B	TRACE	$F26D	$BB	CONT	$D896
$9C	NOTRACE	$F26F	$BC	LIST	$D6A5
$9D	NORMAL	$F273	$BD	CLEAR	$D66A
$9E	INVERSE	$F277	$BE	GET	$DBA0
$9F	FLASH	$F280	$BF	NEW	$D649

TABLE 2
Function Entry Table From $D080-D081

Hex Token	Key Word	Entry Point	Hex Token	Key Word	Entry Point
$D2	SGN	$EB90	$DF	SIN	$EFF1
$D3	INT	$EC23	$E0	TAN	$F03A
$D4	ABS	$EBAF	$E1	ATN	$F09E
$D5	USR	$000A	$E2	PEEK	$E764
$D6	FRE	$E2DE	$E3	LEN	$E6D6
$D7	SCRN(	$D412	$E4	STR$	$E3C5
$D8	PDL	$DFCD	$E5	VAL	$E707
$D9	POS	$E2FF	$E6	ASC	$E6E5
$DA	SQR	$EE8D	$E7	CHR$	$E646
$DB	RND	$EFAE	$E8	LEFT$	$E65A
$DC	LOG	$E941	$E9	RIGHT$	$E686
$DD	EXP	$EF09	$EA	MID$	$E691
$DE	COS	$EFEA			

The Function Entry Table is used during expression evaluation to obtain entry points to the function subroutines in the program area. It consists of 25 two byte entries with low-high addresses. The order of the entries corresponds to the tokens 210 to 234 assigned to the keywords SGN to MID$ as given in (Applesoft, Basic Programming Reference Manual, p.121). Table 2 gives the summary. The description of the function subroutines with their entry points are given in [Crossley].

The Operator Tag and Entry Table is used during expression evaluation. It consists of 10 three-byte entries corresponding to the tokens 200 to 209 assigned to the keywords + to × as given in (Applesoft, Basic Programming Reference Manual, p.121.) Of these three bytes, the first byte contains the Tag which also serves as a precedence number. The next two bytes contain the low-high addresses minus one of the entry points in the program area. Table 3 shows the Tag values and actual entry point addresses.

TABLE 3
Operator TAG and Entry Table From $D0B2-D0CF

Hex Token	Key Word	Hex Tag	Entry Point
$C8	+	$79	$E7C1
$C9	-	$79	$E7AA
$CA	*	$7B	$E982
$CB	/	$7B	$EA69
$CC	^	$7D	$EE97
$CD	AND	$50	$DF55
$CE	OR	$46	$DF4F
$CF	>	$7F	$EED0
$D0	=	$7F	$DE98
$D1	<	$64	$DF65

The Keyword Token Table is used by the Tokenizer routine which replaces keywords by appropriate tokens. It consists of the 107 keywords (from END to MID$) concatenated such that each byte is an ASCII character with high bit set to zero, unless the character is the last one of a keyword, in which case it is set to 1. e.g. it contains

E N D F O **R** N E X T ...

where the bold character indicates that the high bit is one.

The ASCII Message Table contains ASCII characters where the individual message (e.g. the error message part "SYNTAX ERROR") is separated either by having the high bit set to its last character byte, or followed by a zero byte.

1.3 Scattered Data

Scattered data may occur in many places; some of them are the floating point constants, (see: [Crossley] and [Lingwood]), short table for high resolution graphics, (see: [Mesztenyi]).

1.4 Zero Page Load Data

The memory area $F10B-F126 is the CHRGET/CHRGOT routine followed by an initial random number which gets loaded into the Zero page $B1-CC during initialization.

1.5 Stored Program Area

Zero page location $67-68 contain the address (low-high) of the beginning of the stored program, usually $0801. From this address, the memory contains the tokenized label-statements ordered by their line numbers. The format of a tokenized label-statement is as follows:

2-byte	pointer (low-high address) to the next tokenized statement
2-byte	binary value (low-high) of the line number bytes of the tokenized compound-statement
n bytes	of the actual tokenized compound statement
1-byte	containing zero

The last tokenized labeled-statement is followed by two extra bytes containing zero. Thus the stored program has a chain of pointers starting with the contents of $67-68, and ending with a zero value. Each pointer indicates the beginning of a labeled-statement, while a byte containing zero indicates its end; three zero bytes indicate the end of the stored program.

1.6 Variable Areas

These areas and corresponding pointers are adequately described in (Applesoft, Basic Programming Reference Manual), with further explanations in [Golding].

2. CHRGET/CHRGOT SUBROUTINE.

The most important subroutine in Applesoft is the CHRGET/CHRGOT subroutine residing on the Zero page $B1-C8 with the TXTPTR imbedded at $B8-$B9. It has been described in [Crossley], but is repeated here because of its importance.

The CHRGOT entry ($B7) loads the register A with the contents of the memory whose address is in the TXTPTR ($B8-B9, low-high). CHRGET entry (B1) does the same except it increments the TXTPTR prior to loading. If the obtained byte is equal to the ASCII space ($20) then the control goes back to CHRGET, i.e. spaces (blanks) are skipped. Otherwise the flag Z is set if A = $3A or $00, i.e. ASCII colon (:) or null; flag C is set if A is not an ASCII number 0 to 9, i.e. A<$30 or A>$39; finally the control goes back to the calling routine.

The importance of this routine comes into light if one compares it to an instruction fetch cycle in a computer with the TXTPTR as a counter register. The instruction code is returned in register A, flags Z and C, ready to be executed (interpreted). The ASCII space code behaves like a no-op, and is automatically skipped. This feature is realized in the implementation of GOSUB-and RETURN-statements by placing the TXTPTR value together with line-number and tag $B0 on the stack in the GOSUB-statement, resetting them in the RETURN-statement.

Unfortunately, the CALL-statement has been implemented differently by not saving the above data in the stack. It would have been simple to implement in the same way as the GOSUB-statement, and the RETURN -statement could have served as a return address from the machine language subroutine. This would have allowed a call of the Applesoft routine at $D43C with a CALL-statement from a stored program with request for input of a compound-statement ending with RETURN ready to be executed in immediate mode, where the RETURN causes the return to the stored program.

3. PROGRAM STRUCTURE

The overall program structure of Applesoft can be illustrated by the following semantic program:

3.1. Initialization
3.2. Request and receive input from the keyboard.
3.3. Tokenize the input
3.4. If the first character of the input is an ASCII number then store the input as part of the stored program, and GOTO 3.2.
3.5. If the first character of the input is not an ASCII number then execute the input as a program, after which GOTO 3.2.

3.1 Initialization

The Initialization (starting at $F128) sets up the Zero page and various other pointers.

3.2 Input

The input request starts at $D43C. It uses the subroutine at $D52E to display the prompt symbol and through the Monitor GETLN, to receive the input line into the input buffer at $0200. It sets the high bits of the input data to zero, places a zero byte after the last input character, and initializes the TXTPTR to the input buffer address minus one.

3.3 Tokenization

The Tokenization Subroutine ($D559-D619, with entry at $D559) replaces the keywords with the appropriate tokens in the input buffer. It also removes blanks with the result still in the input buffer. It places two extra zero bytes at the end of the line. No syntax checking is performed by this routine.

Following Tokenization, the first character in the input buffer decides whether 3.4 or 3.5 is to be executed.

APPLESOFT INTERNAL STRUCTURE

3.4 Stored Program

If the first character in the input buffer is an ASCII number, then Applesoft assumes it to be the first character of a line-number of a labeled-statement and either inserts it or replaces an old labeled-statement with the same line-number in the stored program with the help of the routine starting at $D46A.

3.5 Execution

If the first character of the input is not an ASCII number, then Applesoft assumes the input to be a compound-statement ready to be executed. It sets the TXTPTR to the beginning of the input buffer and enters into an execution loop at $D805. At this stage, TXTPTR really behaves like a program counter. The execution of a statement advances or changes TXTPTR, e.g. to the stored program. Finally, the control returns to 3.2, requesting new input under the following condition:

(i) Execution of an end- or stop-statement
(ii) Encountering 3 consecutive zero bytes
(iii) Detecting syntax error without an onerr-statement.

Individual statements are recognized by their first, possibly tokenized, byte. If this is between $80 and $BF then it is assumed to be a token, and the statement is executed by jumping to the appropriate entry point listed in Table 1. Otherwise it is assumed to be a let-statement without the word LET. These statement execution routines are called subroutines, but not all of them return.

The execution loop in $D805-D848, and its preceding section in $D7D2-D894, is fairly complex. It is listed below with appropriate remarks.

CONCLUSION

With the knowledge of the Data Structure, one may trace the internal workings of Applesoft based on the five point (3.1 to 3.5) Program Structure, and on the 64 statement interpreter subroutines with the given entry points. There are two difficult parts which need further documentation:

1. The expression evaluation routine, called by FRMEVL in [Crossley], which is used by many statement routines. I think that part of the complication is because Applesoft had been implemented before its syntactic rules were (correctly?) established.
2. The other difficulty lies in the multiple use of the stack. Beside the statement subroutines (GOSUB-, RETURN-,CALL-, FOR- and NEXT-statement), FRMEVL uses it, and also the internal program in Applesoft (JSR, RTS instructions).

References:

[1] Applesoft, Basic Programming Reference Manual.
[2]-[5] are all available in "Call-A.P.P.L.E. in Depth No.1." Apple Pugetsound Program Library Exchange. 1981.
[2] John Crossley: Applesoft Internals.
[3] C.K. Mesztenyi: Notes on Hi-Res Graphics Routines.
[4] David A. Lingwood: Amplifying Applesoft.
[5] Val J. Golding: Applesoft from Bottom to Top.
[6] William F. Luebbert: What's Where in the Apple. Micro Ink, Inc., Chelmsford, MA.

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Statement Handler Routine $D7D2-$D804

```
NEWSTT          TSX             ;Save
                STX   $F8       ;Stackpointer
                JSR   $D858     ;Checks for Ctrl C
                LDA   $B8       ;Get
                LDY   $B9       ;TXTPTR
                LDX   $76       ;Check if immediate mode
                INX             ;($FF in current line nbr)
                BEQ   N1
                STA   $79       ;No, thus put TXTPTR into
                STY   $7A       ;Old  TXTPTR
N1              LDY   #$00      ;Check byte at TXTPTR
                LDA   ($B8),Y
                BNE   COLON     ;If non-zero then it should be ':'
                LDY   #$02      ;If zero then end of compound-st.
                LDA   ($B8),Y   ;Check for end of program
                CLC             ;Zero pointer 2 bytes further
                BEQ   PREND
                INY             ;It is a new labeled-statement
                LDA   ($B8),Y   ;Get and store new
                STA   $75       ;Current line nbr
                INY
                LDA   ($B8),Y
                STA   $76
                TYA             ;Update TXTPTR
                ADC   $B8
                STA   $B8
                BCC   EXECUTE
                INC   $B9
EXECUTE         BIT   $F2       ;Check for the trace bit
                BPL   L1        ;Notrace if positive
                LDX   $76       ;Trace is on, check
                INX             ;For mode
                BEQ   L1        ;No print in immediate mode
                LDA   #$23      ;Print out line nbr
                JSR   $DB5C     ;As trace information
                LDX   $75
                LDA   $76
                JSR   $ED24
                JSR   $DB57
L1              JSR   CHRGET    ;Get first byte of statement
                JSR   STYPE     ;Use JSR to get return address in
                                ;stack for
STTRET          JMP   NEWSTT    ;<--statement execution subroutine
                                ;returns here
PREND           BEQ   $D88A     ;End of program
STYPE           BEQ   $D857     ;Statement type check on its first byte
                SBC   #$80
                BCC   ASGST     ;<$80 then assign-statement
                CMP   #$40
                BCS   $D846     ;>$BF then error
                ASL             ;Otherwise get
                TAY             ;Entry point
                LDA   $D001,Y   ;From the 2-byte
                PHA             ;Statement-type table
                LDA   $D000,Y   ;And put it into stack
                PHA             ;As return address of CHRGET
                JMP   CHRGET    ;And go to there
ASGST           JMP   $DA46     ;Go to LET-st. routine
COLON           CMP   #$3A      ;Check for colon
                BEQ   EXECUTE   ;Yes, go to execute
                JMP   $DEC9     ;Otherwise error


Addresses:      NEWSST          $D7D2       N1      $D7E5
                EXECUTE         $D805       L1      $D81D
                STTRET          $D823       PREND   $D826
                STTYPE          $D828       ASGST   $D83F
                COLON           $D842
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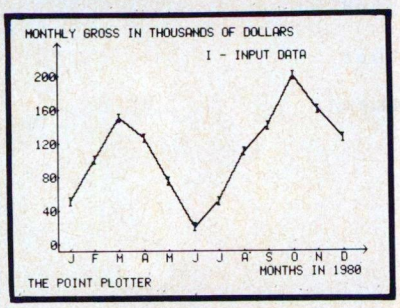

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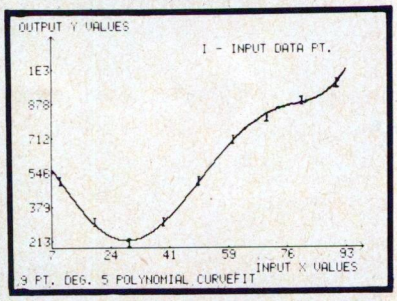

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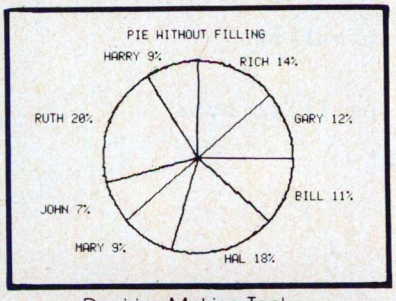

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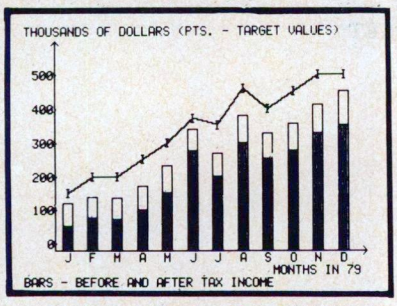

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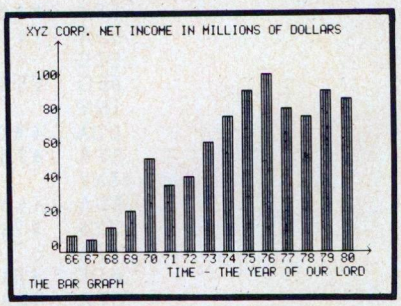

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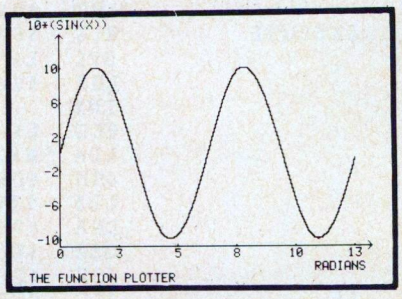

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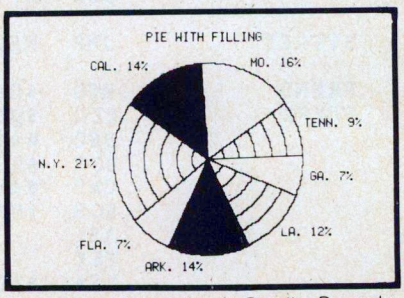

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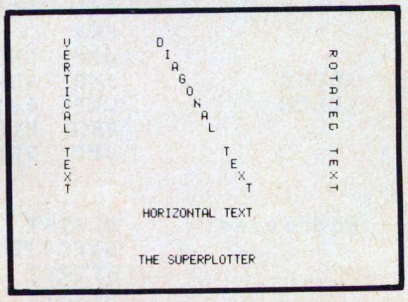

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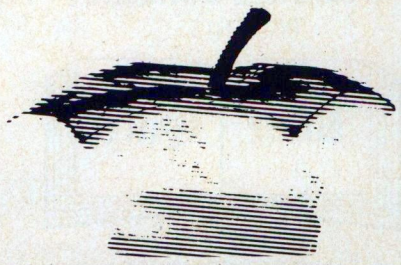

By Cornelis Bongers/Call —A.P.P.L.E. Staff Writer

THIS note explains a small error in DOS 3.3, which causes a system crash now and then. If the crash occurs, it usually happens if one executes a G(o) instruction from monitor command level, for instance, $3D0G or $3D3G to start BASIC. The characteristics of the crash are always about the same, the cursor is positioned somewhere at the right half of the screen and some garbage may be displayed. After the crash DOS commands are still recognized by the Apple (although some of them are not executed correctly) but all Applesoft commands lead to error messages such as OVERFLOW or SYNTAX error.

At first sight there seems to be a simple solution. Because DOS commands are accepted, one might think that the FP command would effectively restore the operation of Applesoft. However, this is not true. Although FP is accepted, it just doesn't seem to work. In fact the only action that restores the Apple to normal working conditions in this situation is the good old reset. However, if reset is not immediately pressed after the crash (before the first carriage return), there is no guarantee that you will get the system working again without rebooting.

One instance in which the problem may arise is when FID has been used. If one executes the "SPACE ON DISK" option, exits FID, enters monitor command level (CALL -151) and next attempts to start BASIC ($3D3G), the crash occurs. In case one tries to restart FID from monitor command level with $803G, the whole screen will be filled with garbage. Despite the garbage, FID starts and asks you to select an option. It is rather surprising that the garbage can be removed by executing the "SPACE ON DISK" option again. Although I didn't lose any files by using FID, while there was apparently something wrong with the system, I advise those who want to experiment to use a scratch diskette.

As another example, there will be no problems if one uses FID to lock a file that was unlocked. However, if an already locked file is locked a second time, the crash will occur if one executes the sequence of instructions mentioned above. The "UNLOCK" option exhibits similar behavior.

Since the system behaved normally once reset had been pressed, the most probable cause of the crash seemed to be a clobbered monitor location. By executing the monitor initialization routines (i.e. SETNORM, INIT, SETVID and SETKBD) one at a time before giving the $3D3G command, it became clear that the crash could be avoided by executing the monitor INIT routine. The INIT routine initializes the "window" parameters and also sets location $48 to zero. Since the window parameters still had their proper values at the execution of INIT, the problem obviously was related to the contents of location $48. This location is used to restore the users status register if a G(o) command is entered. Most flags of the status register have no significance at a cold start of BASIC or FID, but there is one flag that matters. That is the decimal flag and this flag appeared to be responsible for all the trouble. The decimal flag corresponds to the third bit of the status register (the 0th bit is the rightmost bit) and if this flag is set, all calculations (ADC, SBC) are done in "decimal" mode rather than in "binary" mode. Clearly Applesoft, whose internal operation is based on binary arithmetic, gets in deep trouble if it is forced to work in "decimal" mode instead. Once the decimal flag is set, there is no way out, because the CLD instruction is not included in Applesoft's cold start initialization routine. This also explains why FP didn't have any effect. Furthermore, the strange behavior of the cursor is explained because the monitor BASCALC routine also uses binary arithmetic. Finally, execution of FID's "SPACE ON DISK" option turns things back to normal because FID uses "decimal" mode for calculations in the "SPACE ON DISK" routine. Hence, whether or not the decimal flag is set before this routine is executed, it will be cleared by the routine if the calculations have been done.

Now, the remaining question is: what causes a value, of which the third bit is set, to be stored in $48. With a cross reference listing of DOS, this question is easily answered. DOS namely uses $48 and $49 in the RWTS routine to store the address of the IOB table. If DOS finishes a disk operation, $48 is set to zero, which, however, is not done by the RWTS routine, but by another internal DOS routine (at $B37F). So, if the RWTS routine of DOS is called by a user program, things may go wrong, because in that case, upon exit from RWTS, $48 will contain the low address byte of the IOB table, rather than the value zero. The low byte of the DOS IOB table equals $E8 (in which the third bit is set), so all programs that use the DOS IOB table may cause a crash.

THE $48 TRAP

The reason why FID sometimes puts $48 to zero and sometimes not is due to the fact that FID does a part of its file access via its own routines and the other part via the DOS FILE MANAGER. When executing the "LOCK" option, FID looks first in the diskette directory to determine whether the file already is locked. Only if this is not the case, the DOS FILE MANAGER is called to lock the file. The FILE MANAGER puts $48 to zero before it returns control to FID. However, if the FILE MANAGER is not called, $48 will be set to $3C, being the low byte of the IOB table FID uses to read the directory.

Contrary to the "LOCK" option, "SPACE ON DISK" has always the effect that $48 is set to $3C because the FILE MANAGER is not used during the execution of this option.

Apart from patching DOS, there is not an easy solution for this problem. However, a crash can be avoided by setting (in case of doubt) $48 to zero directly when entering monitor command level. Of course, software writers also can help preventing the crash by zeroing $48 before their programs return command to BASIC or to another program. You will note for this same reason, the S. H. Lam "Monitor String" routine always does a "POKE 72,0" immediately prior to the "CALL -144."

```
10  HOME
20 WIDTH = 33: LEFT = 32
30  POKE WIDTH,20: POKE LEFT,20
40  VTAB 24: HTAB 34: PRINT "?"
50  TEXT : RUN
100  REM

SO WHAT DID YOU EXPECT DEPT

BY GLEN BREDON * CALL -A.P.P.L.E.
```


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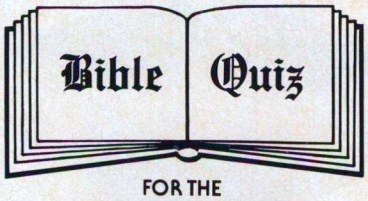

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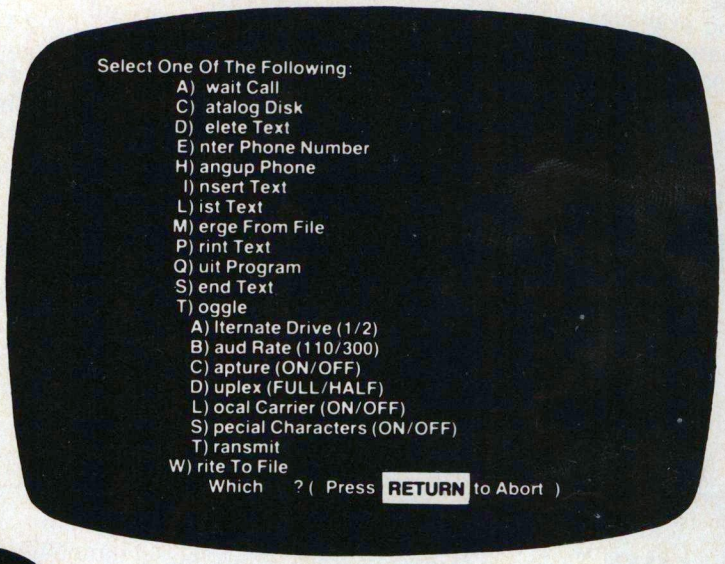

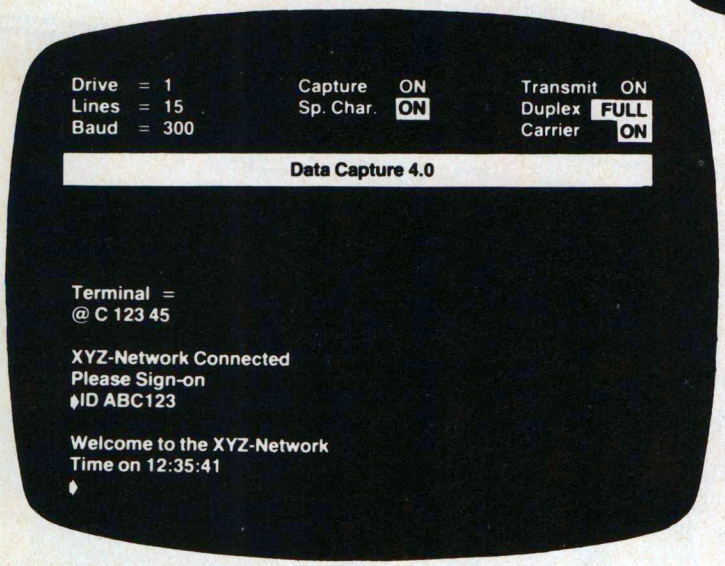

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TRYING TO MAKE CONTACT?

EXPLORING THE WORLD OF APPLE:

Get File Information Subroutine

By Lou Infeld/Apple Computer, Inc.

DID you ever want to access the table of contents of a diskette from within a BASIC program? This machine language subroutine will provide the calling program information from the file directory. Each time it is called, the data for the next file is output. The subroutine will run under either DOS 3.2 or 3.3 without modifications.

User Interface

The inputs to the subroutine are the slot and drive of the volume for which you wish information. Not inputting these values will cause the subroutine to use the slot and drive which was last accessed by DOS. Four fields of information are output:

1) File Status
2) File Type
3) Sector Size
4) File Name

The "File Status" is a one byte field which tells you whether the file is unlocked (ASCII blank), locked ("*"), deleted ("-") or whether there are no more files in the directory (zero). Any other value indicates an I/0 error status.

The "File Type" is another one byte field which indicates whether the file is an Applesoft file ("A"), Integer Basic file ("I"), Binary file ("B") or a Text file ("T").

The "Sector Size" is a 2 byte integer field which indicates the size of the file in sectors.

The "File Name" is the 30 byte name of the file.

To load the subroutine, just "BLOAD GET FILE INFO" from within your program, "POKE 37003" with the desired No., "POKE 37004" with the drive No. and then "CALL 37000" for each file until the "File Status" is zero.

The calling program can stop fetching file information at any point by poking a new slot or drive. This will cause the subroutine to start anew with the diskette in the new drive. If a 0 is used as the new slot No., the subroutine will start over again with the "same" drive it was using.

The outputs can be retrieved starting in location 37005. The "File Status" is in location 37005, the "File Type" is in 37006, the "Sector Size" is in 37007 and 37008 (low byte first) and the "File Name" is in 37009-37038.

Example

The example is an Applesoft program that duplicates the "CATALOG" command. For those of you who have a Thunderclock or some facility to time stamp your files, the example checks for time values in the last 4 bytes of the "File Name" and prints them as time and date. *If line 270 is deleted, the example will also display deleted files.*

Other possible uses of this subroutine could be a general file backup system, checking for the existence of key files, printing diskette labels, etc. The last use was the initial reason I wrote the subroutine.

Programming Internals

The starting location of the subroutine is 37000 ($9088) which was chosen because it is a nice round decimal number and toward the end of Applesoft memory (on a 48K machine). The label "FIRSTLOC" defines the starting location and may be changed for other systems. Two DOS subroutines are used internally: RWTS (Read/Write Track/Sector) and GETIOB (which gets the address of DOS's Input/Output control Block or IOB). To fully understand how this program searches the Volume's File Directory, Appendix C of the DOS 3.3 Manual should be read.

When the program is first CALLed (it can tell this because cell "LASTSLOT" is only zero when first loaded), subroutine INIT is executed which:

1. Checks whether the user has set slot or drive
2. If not, calls GETIOB to get the DOS IOB and takes the slot and drive from there

The current slot and drive are compared to last slot and drive to see whether a new file directory should be searched. If a new directory is indicated (slot or drive has changed), the program:

1. Saves the new slot and drive in LASTSLOT and LASTDRIVE
2. Shifts the slot left four bits (i.e. multiplied by 16) and stores it in two locations in the IOB (IBSLOT and IOBPSN).
3. Stores the drive in two locations in the IOB (IBDRVN and IOBPDN)
4. Sets the track and sector in the IOB to those of the Volume Table of Contents (VTOC)
5. Executes subroutine CALLRWTS to perform the RWTS call to DOS which reads the VTOC sector.

At this point whether or not the slot or drive changed from the previous call, the main subroutine CATALOG is executed.

GET FILE INFORMATION SUBROUTINE

You can think of the Diskette Directory as a series of sectors starting at the VTOC sector. Each sector points to the track and sector of the next sector. When the pointer indicates track 0 and sector 0, there are no more sectors in the directory. Each sector of the Diskette Directory (except VTOC) contains directory entries for up to seven files. Since only the sector location of VTOC is assumed (Track $11, Sector $0), the program doesn't care how many sectors there are in a track and will therefore work under DOS 3.2 or DOS 3.3.

Subroutine CATALOG moves from one file entry to the next, taking into account when a new directory sector has to be read from the diskette. It in turn calls subroutines LOCKED, FILETYPE, FILESIZE and FILENAME to extract the file information and copy them to the output locations. Each file entry is 35 bytes long and contains the following information:

Relative Byte	Contents
0	Track number of file's track/sector list
1	Sector number of file's track/sector list
2	File type
3-22	File name
33-34	File size

If relative byte 0 is 0, the entry does not correspond to a file and is skipped. If that byte is $FF, the file has been deleted. The file type byte (relative byte 2) also contains the locked/unlocked flag.

```
                ********************************
2               *                              *
3               * GET FILE INFORMATION PROGRAM *
4               *                              *
5               *         by  LOU INFELD       *
6               *                              *
7               * Call -A.P.P.L.E. * Jan, 1982 *
8               *                              *
9               * This program will read the   *
10              * catalog of a specified       *
11              * volume, one file at a time   *
12              *                              *
13              * EXAMPLE OF USAGE             *
14              * ----------------             *
15              *                              *
16              * BLOAD GET FILE INFO          *
17              * POKE 37003,SLOT              *
18              * POKE 37004,DRIVE             *
19              * CALL 37000                   *
20              *                              *
21              * Upon return, the output      *
22              * locations contain the        *
23              * following:                   *
24              *                              *
25              * 37005 - " " = UNLOCKED       *
26              *         "*" = LOCKED         *
27              *         "-" = DELETED        *
28              *          0  = END OF DIR     *
29              *         INT = I/O ERR STATUS *
30              * 37006    - FILE TYPE         *
31              * 37007,8  - SECTOR SIZE       *
32              * 37009-38 - FILE NAME         *
33              *                              *
34              * "CALL 37000" should be       *
35              * repeated for each file in    *
36              * directory until STATUS = 0   *
37              *                              *
                ********************************
39              *
40              *-----PARAMETERS
41              *
42              FIRSTLOC EQU  37000       ;FIRST LOCATION
43              VTOCT    EQU  $11         ;VTOC TRACK #
44              VTOCS    EQU  $0          ;VTOC SECTOR #
45              *
46              *-----INPUT/OUTPUT LOCATIONS
47              *
48              ENTRY    EQU  FIRSTLOC    ;USER ENTRY
49              SLOT     EQU  ENTRY+3     ;INPUT SLOT #
50              DRIVE    EQU  ENTRY+4     ;INPUT DRIVE #
51              FILEINFO EQU  ENTRY+5     ;OUTPUT FILE INFO
52              *
53              LOCKDINFOEQU  FILEINFO    ;LOCKED FLAG/STATUS
54              *       ;  *      - LOCKED
55              *       ;  BLANK  - UNLOCKED
56              *       ;  -      - DELETED
57              *       ;  0      - NO MORE FILES
58              *       ;  OTHER  - BAD I/O STATUS
59              TYPEINFO EQU  FILEINFO+1  ;FILE TYPE
60              SIZEINFO EQU  FILEINFO+2  ;FILE SIZE (BINARY - 2 BYTES)
61              NAMEINFO EQU  FILEINFO+4  ;FILE NAME
62              *
63              *-----EQUATES
64              *
65              * DOS
66              *
67              RWTS     EQU  $3D9        ;DOS READ/WRITE TRACK/SECTOR
68              GETIOB   EQU  $3E3        ;GET DOS IOB ADDRESS
69              *
70              * DIRECTORY
71              *
72              CTRK     EQU  1           ;LINK TO NEXT TRACK
73              CSEC     EQU  2           ;LINK TO NEXT SECTOR
74              FFILE    EQU  $B          ;PTR TO 1ST FILE
75              *
76              * FILE DIRECTORY ENTRY
77              *
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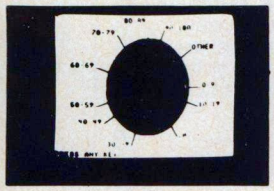

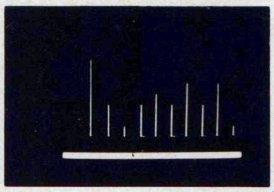

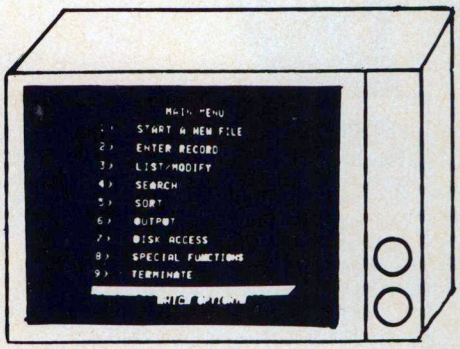

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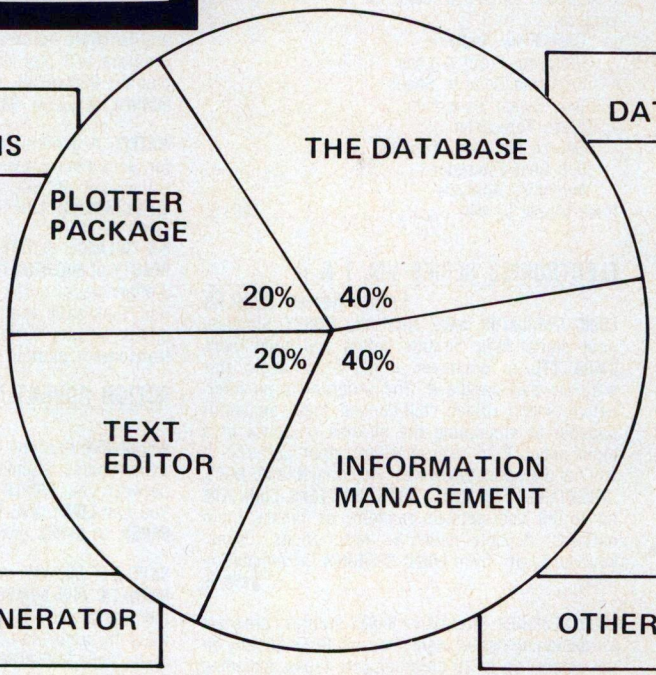

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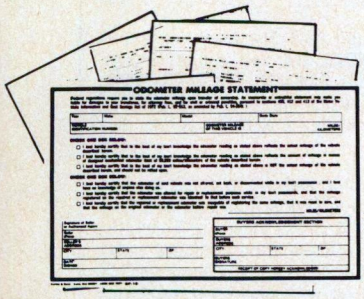

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- You can append or merge up to a full disk of data files, or segment your data into separate files by a search key.
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- Backup disk for $5.00.
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GENERAL LEDGER: A complete accounting system with these features:

- Up to 500 accounts and 500 transactions per month.
- Extensive check register management system (similar to our PFM).
- Prints checks and mailing labels.
- Produces these reports:
  - Transactions Journal
  - Account Ledgers
  - Income Statement
  - Balance Sheet
  - Account Listings

Requires Apple II, 48K RAM, 1 disk drive. $149.95

ACCOUNTS RECEIVABLE: A flexible system with these features:

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- Prints invoices and customer statements & address labels.
- Interfaces to General Ledger.
- Interactive screen-based invoice work sheet.
- Produces these reports:
  - Aged Receivables
  - Sales Analysis
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  - Invoice Search

Requires Apple II, 48K RAM, 2 disk drives $149.95

Both Programs $249.95

UNIVERSAL BUSINESS MACHINE:

An electronic spread sheet structured around a 100 row × 20 column table. User defines row and column names and equations forming a unique template. Table elements can be multiplied, added, subtracted, divided, summed, averaged and accumulated. Hundreds of unique templates can be created, used, stored and recalled for later use. Supplied with 8 standard templates ready for use covering these subjects.

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- Proforma Balance Sheet
- Real Estate Investment
- Sales Forecaster
- Source and Use of Funds
- Job Cost Estimator
- Inventory Analysis

Price (Apple II, 48K) $89.95

ELECTRONICS SERIES VOL I & II:

Entire Series $259.95

LOGIC SIMULATOR: SAVE TIME AND MONEY. Simulate your digital logic circuits before you build them. **CMOS, TTL,** or whatever, if it's digital logic, this program can handle it. The program is an interactive, menu driven, full-fledged logic simulator capable of simulating the bit-time response of a logic network to user-specified input patterns. It will handle up to 1000 gates, including **NANDS, NORS, INVERTERS, FLIP-FLOPS, SHIFT REGISTERS, COUNTERS** up to 20 user-defined random, or binary input patterns. Accepts network descriptions from keyboard or from **LOGIC DESIGNER** for simulation (48K) $159.95

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ELECTRONIC SERIES VOL III & IV:

Entire Series $259.95

CIRCUIT SIMULATOR: Tired of trial & error circuit design? Simulate & debug your designs before you build them! With **CIRCUIT SIMULATOR** you build a model of your circuit using **RESISTORS, CAPACITORS, INDUCTORS, TRANSISTORS, DIODES, VOLTAGE** and **CURRENT SOURCES** and simulate the waveform response to inputs such as **PULSES, SINUSOIDS, SAWTOOTHS,** etc... all fully programmable. The output is displayed as an **OSCILLOSCOPE-STYLE PLOT** of the selected waveforms or as a printed table of voltage vs time. Handles up to 50 nodes and 100 components. Requires 48 **RAM** $159.95

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DEALER INQUIRIES INVITED.

GET FILE INFORMATION SUBROUTINE

```
                        78   FTYPE    EQU  2            ;FILE TYPE
                        79   FNAME    EQU  3            ;FILE NAME
                        80   FSEC     EQU  $21          ;FILE SECTOR COUNT
                        81   *
                        82   *
                        83   *
                        84   TEMP     EQU  $F9
                        85   *
                        86   *-----ENTRY
                        87   *
                        88            ORG  FIRSTLOC
9088: 4C C7 91          89            JMP  START
908B: 00 00             90            DFB  0,0          ;SLOT,DRIVE
                        91            DS   35           ;OUTPUT
                        92   *
                        93   *-----INPUT/OUTPUT CONTROL BLOCK
                        94   *-----   (IOB)
                        95   *
                        96   IOB      EQU  *
90B0: 01                97            DFB  1
                        98   IBSLOT   DS   1
                        99   IBDRVN   DS   1
90B3: 00                100           DFB  0
90B4: 11                101  IBTRK    DFB  VTOCT
90B5: 00                102  IBSECT   DFB  VTOCS
90B6: C1 90             103           DA   DCT
90B8: C7 90             104           DA   BUFF
90BA: 00 00 01          105           DFB  0,0,1
                        106  IBSTAT   DS   1
                        107           DS   1
                        108  IOBPSN   DS   1
                        109  IOBPDN   DS   1
                        110  *
                        111  *-----DEVICE CHARACTERISTIC TABLE
                        112  *-----   (DCT)
                        113  *
                        114  DCT      EQU  *
90C1: 00 01 EF
90C4: D8                115           DFB  0,1,$EF,$D8
                        116  *
                        117  *-----DATA
                        118  *
90C5: 00                119  LASTSLOT DFB  0
90C6: 00                120  LASTDRIV DFB  0
                        121  BUFF     DS   256          ;SECTOR BUFFER
                        122  *
                        123  *-----START
                        124  *
                        125  START    EQU  *
91C7: AE C5 90          126           LDX  LASTSLOT     ;1ST TIME EXECUTED?
91CA: D0 03             127           BNE  *+5
91CC: 20 1E 92          128           JSR  INIT         ;YES, INITIALIZE
91CF: AD 8B 90          129           LDA  SLOT         ;CHECK IF SLOT OR
91D2: AC 8C 90          130           LDY  DRIVE        ;DRIVE HAS CHANGED
91D5: CD C5 90          131           CMP  LASTSLOT     ;IF SO, RE-INTIALIZE RWTS
91D8: D0 08             132           BNE  NEWCAT
91DA: CC C6 90          133           CPY  LASTDRIV
91DD: D0 03             134           BNE  NEWCAT
91DF: 4C 1A 92          135           JMP  MCONT2
91E2: AD 8B 90          136  NEWCAT   LDA  SLOT         ;CHECK IF USER SET SLOT TO 0
91E5: D0 06             137           BNE  MCONT1
91E7: AD C5 90          138           LDA  LASTSLOT     ;IF SO, USE LAST SLOT
91EA: 8D 8B 90          139           STA  SLOT
91ED: 8D C5 90          140  MCONT1   STA  LASTSLOT    ;SAVE SLOT/DRIVE
91F0: 8C C6 90          141           STY  LASTDRIV
91F3: 0A                142           ASL               ;STORE SLOT*16 IN IOB
91F4: 0A                143           ASL
91F5: 0A                144           ASL
91F6: 0A                145           ASL
91F7: 8D B1 90          146           STA  IBSLOT
91FA: 8D BF 90          147           STA  IOBPSN
91FD: 8C B2 90          148           STY  IBDRVN       ;STORE DRIVE IN IOB
9200: 8C C0 90          149           STY  IOBPDN
9203: A9 11             150           LDA  #VTOCT       ;POINT TO VTOC
9205: 8D B4 90          151           STA  IBTRK
9208: A9 00             152           LDA  #VTOCS
920A: 8D B5 90          153           STA  IBSECT
```

GET FILE INFORMATION SUBROUTINE

```
920D: A9 00    154           LDA  #0          ;INITIALIZE FILE INFO
920F: 8D 8D 90 155           STA  LOCKDINFO
9212: 20 09 93 156           JSR  CALLRWTS    ;CALL RWTS
9215: AD 8D 90 157           LDA  LOCKDINFO   ;CHECK FOR I/O ERROR
9218: D0 03    158           BNE  DONE        ;EXIT IF ERROR
921A: 20 4F 92 159 MCONT2    JSR  CATALOG     ;GET NEXT FILE INFO
921D: 60       160 DONE      RTS              ;RETURN TO CALLING PROGRAM
               161 *
               162 *-----INITIALIZE
               163 *
               164 INIT      EQU  *
               165 *
               166 *
               167 *-CHECK IF SLOT/DRIVE SET BY USER
               168 *
921E: AD 8B 90 169           LDA  SLOT        ;INPUT SLOT
9221: F0 08    170           BEQ  INITC1      ;IF 0, GET DOS IOB
9223: AD 8C 90 171           LDA  DRIVE       ;INPUT DRIVE
9226: F0 03    172           BEQ  INITC1      ;IF 0, GET DOS IOB
9228: 4C 4D 92 173           JMP  INITR       ;BOTH INPUTS SET BY USER, RETURN
922B: 20 E3 03 174 INITC1    JSR  GETIOB      ;GET DOS IOB ADDR
922E: 85 FA    175           STA  TEMP+1
9230: 84 F9    176           STY  TEMP
9232: A0 01    177           LDY  #1          ;GET SLOT
9234: AD 8B 90 178           LDA  SLOT
9237: D0 09    179           BNE  INITC2
9239: B1 F9    180           LDA  (TEMP),Y
923B: 4A       181           LSR
923C: 4A       182           LSR
923D: 4A       183           LSR
923E: 4A       184           LSR
923F: 8D 8B 90 185           STA  SLOT        ;STORE
9242: C8       186 INITC2    INY
9243: AD 8C 90 187           LDA  DRIVE
9246: D0 05    188           BNE  INITR
9248: B1 F9    189           LDA  (TEMP),Y    ;GET DRIVE
924A: 8D 8C 90 190           STA  DRIVE
               191 *
924D: 60       192 INITR     RTS              ;RETURN
               193 *
               194 *-----GET CATALOG
               195 *
924E: 00       196 CATCOUNT  DFB  0
               197 CATALOG   EQU  *
924F: A9 00    198           LDA  #0          ;INIT OUTPUT
9251: 8D 8D 90 199           STA  LOCKDINFO
9254: AD 4E 92 200           LDA  CATCOUNT    ;NEW FILE SECTOR?
9257: D0 2D    201           BNE  CATCONT1    ;IF NOT, GO TO WORK
9259: AD C8 90 202           LDA  BUFF+CTRK   ;GET NEXT DIR TRACK #
925C: 8D B4 90 203           STA  IBTRK       ;STORE IN IOB
925F: AD C9 90 204           LDA  BUFF+CSEC   ;GET NEXT DIR SECT #
9262: 8D B5 90 205           STA  IBSECT      ;STORE IN IOB
9265: 18       206           CLC              ;CHECK IF NO MORE DIRECTORIES
9266: 6D B4 90 207           ADC  IBTRK
9269: D0 06    208           BNE  CATCONT0    ;IF DONE, CLEAR LASTSLOT
926B: 8D C5 90 209           STA  LASTSLOT    ;FOR NEXT APPLICATION
926E: 4C B9 92 210           JMP  CATDONE
9271: 20 09 93 211 CATCONT0  JSR  CALLRWTS    ;CALL RWTS
9274: AD 8D 90 212           LDA  LOCKDINFO   ;CHECK FOR I/O ERROR
9277: D0 40    213           BNE  CATDONE     ;EXIT IF ERROR
9279: A9 D2    214           LDA  #<BUFF+FFILE ;1ST FILE ENTRY
927B: 85 FB    215           STA  TEMP+2
927D: A9 90    216           LDA  #>BUFF      ;SAVE HB OF FILE ENTRY
927F: 85 FC    217           STA  TEMP+3
9281: A2 07    218           LDX  #7          ;SET LOOP COUNTER
9283: 8E 4E 92 219           STX  CATCOUNT    ; TO 6
9286: A0 00    220 CATCONT1  LDY  #0          ;GET TRACK/SECTOR LIST
9288: B1 FB    221           LDA  (TEMP+2),Y  ;TRACK NUMBER
928A: F0 18    222           BEQ  CATCONT4    ;IF 0, SKIP THIS FILE ENTRY
928C: C9 FF    223           CMP  #$FF        ;IF FF, FILE DELETED
928E: D0 08    224           BNE  CATCONT2
9290: A9 2D    225           LDA  #'-'        ;SET LOCKED FLAG TO '-'
9292: 8D 8D 90 226           STA  LOCKDINFO
9295: 4C 9B 92 227           JMP  CATCONT3
9298: 20 BA 92 228 CATCONT2  JSR  LOCKED      ;GET LOCKED FLAG
929B: 20 D4 92 229 CATCONT3  JSR  FILETYPE    ;GET FILE TYPE
929E: 20 E3 92 230           JSR  FILESIZE    ;GET FILE SIZE
```

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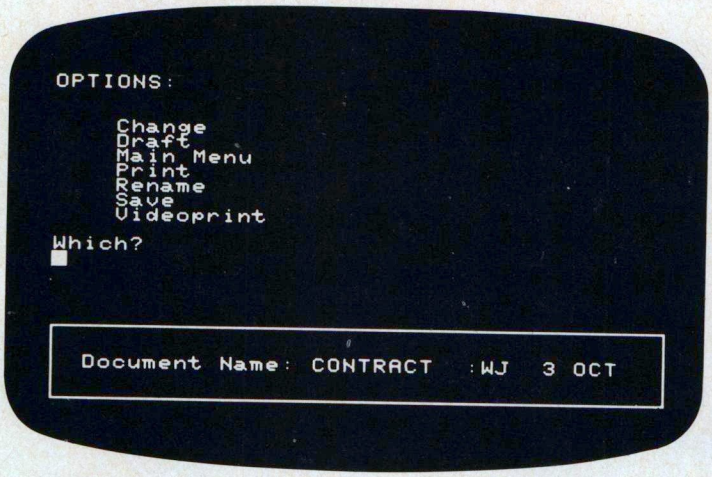

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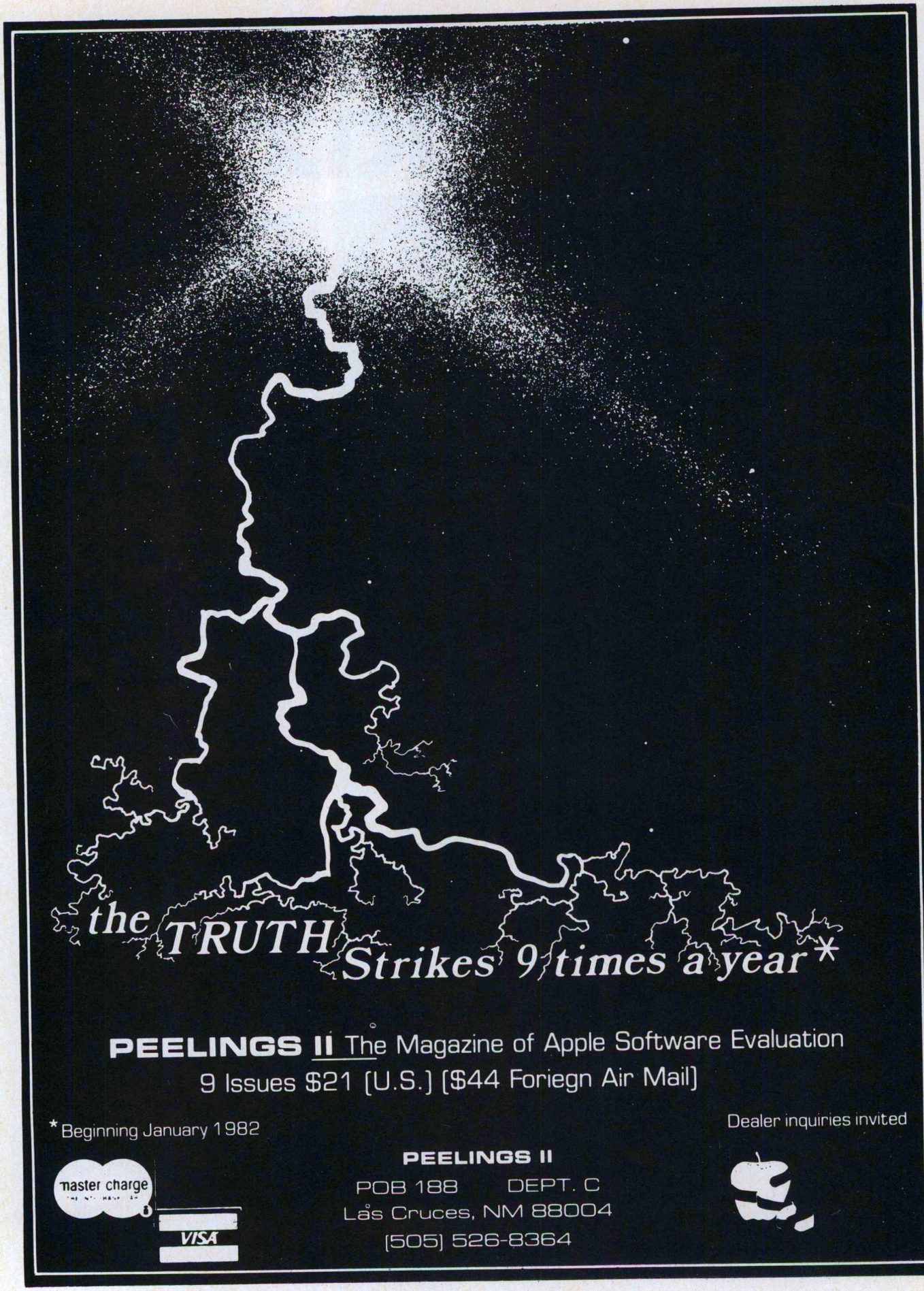

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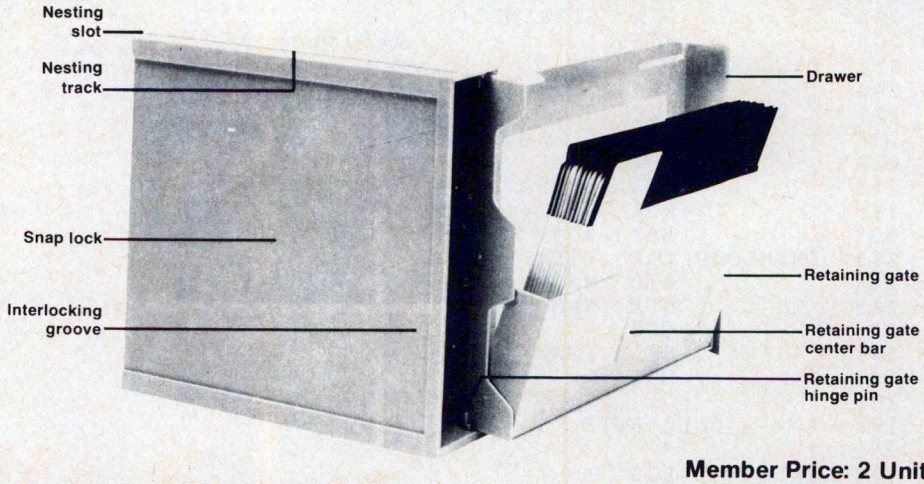
GET FILE INFORMATION SUBROUTINE

```
92A1: 20 F1 92  231              JSR   FILENAME     ;GET FILE NAME
92A4: 18        232  CATCONT4   CLC
92A5: A5 FB     233              LDA   TEMP+2       ;GET FILE ENTRY LOC
92A7: 69 23     234              ADC   #$23         ;BUMP TO NEXT FILE ENTRY
92A9: 85 FB     235              STA   TEMP+2
92AB: A9 00     236              LDA   #0
92AD: 65 FC     237              ADC   TEMP+3
92AF: 85 FC     238              STA   TEMP+3
92B1: CE 4E 92  239              DEC   CATCOUNT     ;DECREMENT LOOP COUNTER
92B4: AD 8D 90  240              LDA   LOCKDINFO    ;IF FILE WAS SKIPPED
92B7: F0 96     241              BEQ   CATALOG      ;PROCESS NEXT ONE
92B9: 60        242  CATDONE    RTS                ;RETURN
                243  *
                244  *-----GET CATALOG SUBROUTINES
                245  *
                246  *-TEMP+2,3 - ADDR OF FILE ENTRY
                247  *
                248  LOCKED     EQU   *
92BA: A0 02     249              LDY   #FTYPE
92BC: A2 20     250              LDX   #' '
92BE: B1 FB     251              LDA   (TEMP+2),Y   ;GET FILE TYPE
92C0: 10 02     252              BPL   FCONT        ;CHECK SIGN BIT
92C2: A2 2A     253              LDX   #'*'         ;FILE LOCKED
92C4: 8A        254  FCONT      TXA
92C5: 8D 8D 90  255              STA   LOCKDINFO    ;OUTPUT '*' OR ' '
92C8: 60        256              RTS                ;RETURN
92C9: 54 49 41
92CC: 3F 42 3F
92CF: 3F 3F 53
92D2: 3F 52     257  FILETBL    ASC   'TIA?B???S?R'
                258  FILETYPE   EQU   *
92D4: A0 02     259              LDY   #FTYPE
92D6: B1 FB     260              LDA   (TEMP+2),Y   ;GET FILE TYPE
92D8: 29 7F     261              AND   #$7F         ;CLEAR SIGN BIT
92DA: A8        262              TAY
92DB: BE C9 92  263              LDX   FILETBL,Y    ;GET CORR TYPE LETTER
92DE: 8A        264              TXA
92DF: 8D 8E 90  265              STA   TYPEINFO     ;OUTPUT IT
92E2: 60        266              RTS                ;RETURN
                267  FILESIZE   EQU   *
92E3: A0 21     268              LDY   #FSEC        ;GET FILE SECTOR COUNT
92E5: B1 FB     269              LDA   (TEMP+2),Y
92E7: 8D 8F 90  270              STA   SIZEINFO
92EA: C8        271              INY
92EB: B1 FB     272              LDA   (TEMP+2),Y
92ED: 8D 90 90  273              STA   SIZEINFO+1
92F0: 60        274              RTS                ;RETURN
                275  FILENAME   EQU   *
92F1: A5 FB     276              LDA   TEMP+2
92F3: 18        277              CLC
92F4: 69 03     278              ADC   #FNAME       ;ADDR OF FILE NAME
92F6: 85 F9     279              STA   TEMP
92F8: A5 FC     280              LDA   TEMP+3
92FA: 85 FA     281              STA   TEMP+1
92FC: A0 1E     282              LDY   #30
92FE: B1 F9     283  FNAMLOOP    LDA   (TEMP),Y
9300: 29 7F     284              AND   #$7F         ;REMOVE MSB
9302: 99 91 90  285              STA   NAMEINFO,Y
9305: 88        286              DEY
9306: 10 F6     287              BPL   FNAMLOOP
9308: 60        288              RTS                ;RETURN
                289  *
                290  *-----CALL RWTS
                291  *
                292  CALLRWTS   EQU   *
9309: A0 B0     293              LDY   #<IOB        ;SET UP THE
930B: A9 90     294              LDA   #>IOB        ;IOB ADDRESS
930D: 20 D9 03  295              JSR   RWTS         ;DOS:CALL RWTS
9310: 90 06     296              BCC   ERWTS        ;=0,GOOD COMPLETION.
9312: AD BD 90  297              LDA   IBSTAT
9315: 8D 8D 90  298              STA   LOCKDINFO    ;OUTPUT BAD STATUS
9318: 60        299  ERWTS      RTS                ;RETURN

--END ASSEMBLY--      ERRORS: 0        657 BYTES
```

GET FILE INFORMATION SUBROUTINE

```
]LIST

100  REM

     GET FILE INFO TEST

CALL -A.P.P.L.E. * JAN. 1982

105  HIMEM: 37000
110 D$ =  CHR$ (4)
120  PRINT : PRINT D$;"BLOAD GET
     FILE INFO"
130 GFILE = 37000: REM  GET FILE
     INFO SUBROUTINE
140 SLOT = GFILE + 3:DRIVE = GFIL
     E + 4: REM  INPUTS
150 FLOCKED = GFILE + 5:FTYPE = G
     FILE + 6:FSIZE = GFILE + 7:N
     AME = GFILE + 9: REM   OUTPU
     TS
160  HOME : PRINT "CATALOG INFORM
     ATION": PRINT
170  PRINT "SLOT,DRIVE ? ";
180  GET C$: PRINT C$;: IF  ASC (
     C$) = 13 GOTO 240
190  POKE SLOT, VAL (C$)
200  GET C$: PRINT C$;: IF  ASC (
     C$) = 13 GOTO 240
210  GET C$: PRINT C$
220  POKE DRIVE, VAL (C$)
230  PRINT
240  CALL GFILE
250  IF  PEEK (FLOCKED) = 0 THEN
      END
260 S$ =  CHR$ ( PEEK (FLOCKED))
270  IF S$ = "-" GOTO 240
280 F$ = ""
290  FOR I = 0 TO 29
300 F$ = F$ +  CHR$ ( PEEK (NAME +
     I))
310  NEXT I
320  REM  CHECK FOR POSSIBLE TIME
     STAMP
330  IF  PEEK (NAME + 27) )  = 24
      GOTO 430
340 MO$ =  STR$ ( PEEK (NAME + 29
     ))
350  IF  LEN (MO$) = 1 THEN MO$ =
     "0" + MO$
360 DA$ =  STR$ ( PEEK (NAME + 28
     ))
370  IF  LEN (DA$) = 1 THEN DA$ =
     "0" + DA$
380 H$ =  STR$ ( PEEK (NAME + 27)
     )
390  IF  LEN (H$) = 1 THEN H$ = "
     0" + H$
400 M$ =  STR$ ( PEEK (NAME + 26)
     )
410  IF  LEN (M$) = 1 THEN M$ = "
     0" + M$
420 F$ =  LEFT$ (F$,21) + MO$ + "
     /" + DA$ + " " + H$ + ":" +
     M$
430  IF S$ = "*" OR S$ = " " OR S
     $ = "-" GOTO 450
440  PRINT "I/O ERROR "; ASC (S$)
     : END
450 T$ =  CHR$ ( PEEK (FTYPE))
460 SIZE = 256 *  PEEK (FSIZE + 1
     ) +  PEEK (FSIZE)
470  PRINT S$;T$;" ";
480  IF SIZE < 100 THEN  PRINT "0
     ";
490  IF SIZE < 10 THEN  PRINT "0"
     ;
500  PRINT SIZE;" ";F$
510 X =  FRE (0)
520  GOTO 240
```


A.P.P.L.E. Presents the Disk Bank



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A IS FOR APPLE:

Check Book Balancer

By Ralph H. Swerdlow, M.D.

IF balancing your checkbook is not only a chore, but a bore, why don't you ADD a little spice to the job. Use your APPLE to help you. Here is a simple program that will do the job for you.

```
10 REM CHECK BOOK BALANCER
20 TEXT:HOME
30 PRINT TAB(10)"CHECK BOOK
   BALANCER"
40 POKE 34,4:VTAB 5
50 INPUT "KNOWN BALANCE IS : $";
   PB
```

Line 10 is a remark indicating the name of the program. Everything after the "REM" will not print. This is a good way to keep track of your programs. You can add dates or other information here for future reference.

Line 20 sets the screen to its full scope of 24 X 40 size and, of course, the HOME clears the screen to blank. Line 40 prints across the top of the screen the words "CHECK BOOK BALANCER", and then sets the top line of the screen to below vertical position 4. The VTAB, in line 40, will print the next output to the screen to vertical row 5.

Line 50 asks the user to enter the last known balance and then sets PB to this value. Note the use of the "$" in line 50. It is *not* a string function, and is between the quotation marks. Therefore it will be printed to the screen and is, of course, the symbol indicating money!! Other lines will use this symbol in a similar fashion.

```
55 PB=INT (PB*100+0.5)/100
60 VTAB 10: RPINT "YOUR KNOWN
   BALANCE IS : $";PB
70 VTAB 12:PRINT"IF CORRECT, HIT
   <Y>...IF NOT, HIT <N>"
```

Line 55, rounds off the Value of PB to two decimal places, and insures accuracy to two places. This is particularly useful in applications involving money calculations. Line 60 then prints the value that was entered, (note where the "$" sign is) and line 70 asks if it is correct.

```
80 GET C$:IF C$ ="N" THEN GOTO 20
85 IF C$<>"N" AND C$<>"Y" THEN
   CALL —198:PRINT "RE-ENTER":
   GOTO 60
90 HOME:VTAB 8:HTAB 4
```

Line 80 asks for the String C$. If it is "No", the program goes back to line 20 and starts over. If it is neither "Y" nor "N", line 85 rings APPLE's bell to call the users attention to an incorrect response, and then returns the program to line 70 for another try. Call —198 is a machine language subroutine that when used, rings the bell. Line 90 continues the program if C$ is "Y". Line 90 clears the screen, and sets the locations where the next statements will be printed.

```
95 PRINT "NEXT TRANSACTION IS :"
100 VTAB 12:HTAB 12: PRINT"<C>
    CHECK"
110 VTAB 14:HTAB 12:PRINT "<D>
    DEPOSIT"
115 VTAB 16:HTAB 12:PRINT "<Q>
    QUIT"
120 VTAB 18: HTAB 20: PRINT
    "WHICH ?"
130 GET T$
```

Lines 95 to 120 format a menu that allows the user to select which transaction is to be chosen. Line 130 sets up a string called "T$".

```
140 IF T$="Q" THEN HOME:VTAB 12:
    PRINT "NEW BALANCE IS : $";PB:
    VTAB 20:HTAB 19: PRINT "SO
    LONG":END
150 IF T$="C" THEN GOTO 1000
160 IF T$="D" THEN GOTO 2000
170 IF T$<>"C" AND T$<>"D" AND T$
    <>"Q " THEN CALL —198:PRINT
    "TRY AGAIN":GOTO 120
180 END
1000 HOME
1010 VTAB 5: INPUT"ENTER
     AMOUNT OF CHECK : $";AC
1020 PRINT:PRINT"OLD BALANCE
     WAS : $ "PB
1030 PB=PB—AC:PB=INT(PB*100+
     .05)/100
1040 PRINT:PRINT "AND NEW
     BALANCE IS: $";PB
1050 VTAB 20:HTAB 15:PRINT"HIT
     ANY KEY TO CONTINUE.":GET
     C$:GOTO 90
```


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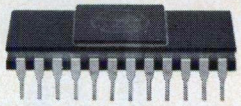

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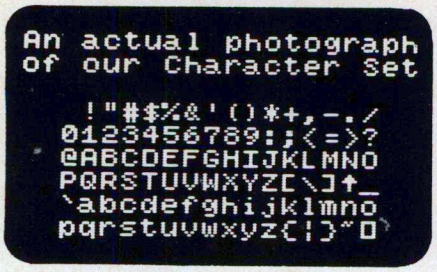

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CHECK BOOK BALANCER

These lines set up a subroutine that prints the old balance, subtracts the amount of the check, and then prints the new balance. Again, note the use of the rounding off formula in line 1030.

```
2000 HOME:VTAB 6:INPUT "ENTER
     AMOUNT OF DEPOSIT : $";AD
2010 PRINT:PRINT "OLD BALANCE
     WAS : $";PB
2020 PB=PB+AD:PB=INT (PB*100+
     0.5)/100:
2030 PRINT:PRINT "AND NEW
     BALANCE IS : $";PB
2040 VTAB 20:HTAB 15:PRINT "HIT
     ANY KEY TO CONTINUE ";GET
     C$:GOTO 90
```

These lines set up a subroutine that first asks for the amount of the deposit, then prints the old balance and then the new balance. Line 2020, by this time, needs no explanation.

When this program is first run, it asks the user to enter the last known checkbook balance, then asks to verify that the amount added is correct. If it was entered correctly, a menu is presented, from which the user selects the next transaction, deposit, check or to quit. The user is given the chance to write in his real checkbook the answers given by the APPLE before continuing with the program. The quit option gives the last balance to allow the user to verify his last entry into his real life checkbook.

Expenses, such as carrying charges, should be entered as a check, and interest earned may be entered as a deposit. If you make a mistake in your typing and enter an amount that is incorrect, remember the amount. Then re-enter as the opposite from what you did at first. For example if you mistype a check entry, redo with the same amount as a deposit and you will have corrected the error.

Save this program to a disk with the name of "CHECK BOOK BALANCER" and whenever you need to balance your checkbook, use it. You won't be any richer, but you can at least now tolerate the chore!

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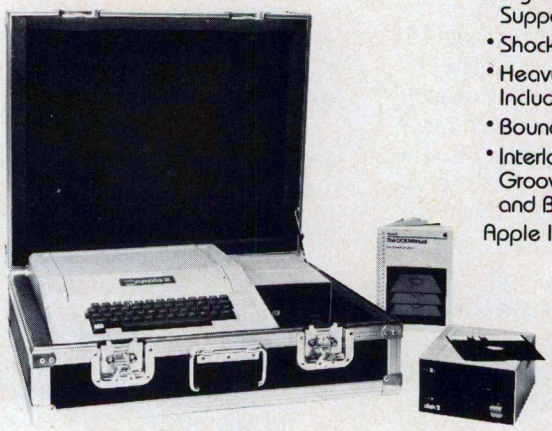

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By Lee Reynolds/Call —A.P.P.L.E./Staff Writer

THERE are certain things which Applesoft and DOS will not ordinarily allow you to do in immediate mode, which are prefectly all right inside a program. Thus, GET, INPUT and Defined Functions are not allowed by Applesoft outside of a program; similarly, OPEN, READ, and WRITE are disallowed by DOS when not done in a program. In the first case you get Applesoft's message "Illegal Direct", and in the second case you get the DOS message "Not Direct Command".

These restrictions can be very inconvenient sometimes. For example, it certainly would be nice it if were possible to do READs of a Text File in immediate mode, rather than always having to write a program to do it. It would also be very handy if you could Define a Function in immediate mode and then use it to compute the values for various arguments you would pass to the function in immediate mode...

Well, guess what: it is possible to get around both of these restrictions! The way to get DOS to allow OPEN, READ, etc. in immediate mode has been covered at least a couple of times in previous issues of Call —A.P.P.L.E. The most recent discussion of this was in the February issue, in the article "DOS Internals". What you have to do is modify RAM DOS with a few POKEs, as follows:

```
POKE 40993,234
POKE 40994,234
POKE 40995,234
```

Or, you can do it in the monitor, this way:

```
CALL -151
A021: EA EA EA N E003G
```

What this does is put some NOP's over the instructions which check for the Not Direct Command case. (By the way, all addresses are for a 48K machine. If you have less memory, subtract the difference between 48K =49152=$C000 and your memory size from the DOS addresses mentioned in this article.)

Once the above has been done, you can now OPEN and READ a text file in immediate mode! However, that doesn't do much good, because you still cannot INPUT any records, since Applesoft won't allow you to use the INPUT statement in immediate mode!

Now, what tells Applesoft that you are in immediate mode is the value of a certain page zero location: $76 (=118 in decimal.) If the value of this location is $FF (=255 in decimal), then you are typing in a program or direct command; if the value is less than $FF, then it knows you are running a program. So-o-o-o, how about typing in this statement to do your input:

```
POKE 118,0:INPUT A$
```

It works, but unfortunately, now your INPUT is expected to come from the keyboard. In order to input from a file which you have opened in immedicate mode, you have to put the READ and INPUT on the same line, like in this example:

```
OPEN TEST FILE
POKE 118,0:PRINT CHR$(4) "READ
  TEST FILE":FOR I=1 TO 10:INPUT
  A$(I):NEXT
```

The above example assumes that you have a sequential Text File on your disk named "TEST FILE", which has at least 10 records in it that you want to read into the string array A$. (You must also have previously done the modifications of DOS to allow direct commands, of course.)

Now, how about the Defined Function in immediate mode? Suppose, for example, you wanted to define a function you could use to compute the values modulo 16 of various numbers. Here is how to do it:

```
POKE 118,0:DEF FNMOD16(A)=A-16*
  INT(A/16)
```

Then you can use it to do your arithmetic like this:

```
PRINT FNMOD 16 (243)
PRINT FNMOD 16 (185)
```

etc.

This technique could save you a lot of typing if your function is long and complicated!

Here's another thing that would be nice to be able to do: use the INPUT or GET command inside an EXEC file. For example, you might write a little EXEC file to request you to type in at the keyboard a number whose factorial the EXEC file would compute. . . Or suppose you have several programs which you normally run in a certain sequence to perform some tasks, and based upon your answer to a question that the EXEC file asks you, you might alter the sequence. Here are my two examples:

compute factorial EXEC file

```
POKE 118,0:POKE 43699,0:INPUT
  "NUMBER TO COMPUTE
  FACTORIAL OF?";NUM:POKE
  43699,1
NFACT=1:FOR N=1 TO NUM: NFACT
  = NFACT * N: NEXT
PRINT "FACTORIAL: ";NFACT
```

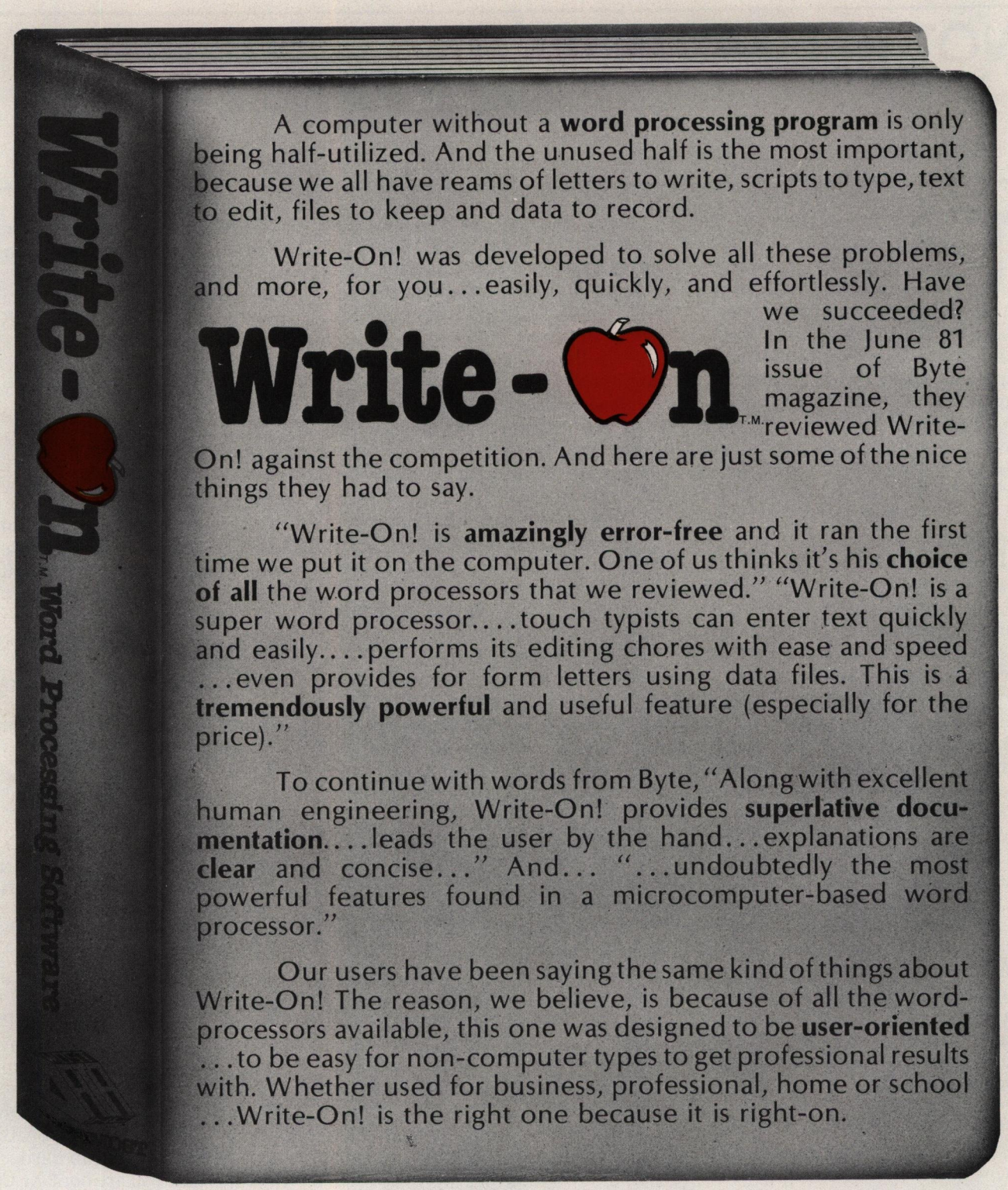
alter task sequence EXEC file

```
RUN PROG1
RUN PROG2
POKE 118,0:POKE 43699,0:PRINT
  "CONTINUE TO PROG3 (Y-N)? ";:
  GET YN$:POKE 43699,1
IF YN$ = "Y" THEN PRINT CHR$(4)
  "RUN PROG3"
```

As you can see from the above examples, there is another POKE that has to be done besides the POKE to location 118 in order to have an EXEC file accept input from the keyboard, instead of from the next line in the EXEC file! This POKE to location 43699 (which is $AAB3 in hex) fools DOS temporarily into thinking that you are not EXECing a file. A nonzero value re-sets the flag.

Incidentally, you would use these same POKEs inside PROG1, PROG2, or PROG3 if they do any INPUTs or GETs from the keyboard. . .

Well, if you've understood all this, get busy thinking about other uses for these techniques! I'm sure if you think about it, you can come up with a lot of useful applications for these principles. Now those special commands need NOT be illegal in direct mode. . .



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/// CORNERS:

VISI-/// UTILITY

By John Mancino

ALTHOUGH I take great pleasure in writing my own applications programs in BASIC, Pascal, and Assembler, there is nothing quite so handy as VISICALC for quick and dirty or fairly involved personalized decision making. This, however, is not a discourse on VISICALC (plenty of those exist) but rather an offering of utilities for VISICALC file manipulation on the APPLE III.

In working with VISICALC, first on the APPLE II and now on the III, there were many times when I wished that I had the ability to manipulate the files in various ways not provided for in VISICALC. This desire led to my writing a program for the APPLE II to perform these functions, and finally to this program for the III. Although I would have preferred to write several of the routines in this program in machine language for the purposes of speed, there are no facilities currently available to either write or call machine code in the III's native mode. Thus this program is written entirely in Business Basic and can be rather slow when manipulating long files.

In spite of the above limitation, the real value of this program becomes apparent as your VISICALC models increase in size. I currently have several models that use all 71K bytes of available memory. These models each contain approximately 3000 separate coordinates which are either calculated or require data entry. Also, in the course of using them, I frequently have the need to make minor adjustments in the formulas and formatting. Since these models are used for yearly budgets which require totally new data each time they are used, the most advantageous situation is to be able to start the budgeting process with a "clean", up-to-date (formula and format wise) sheet with prompts to highlight coordinates requiring data entry. (If you use a prior period sheet that is already filled in to start over with, it is normally difficult to remember which coordinates are calculated and which require data entry.) This program enables me to create this kind of updated sheet from my most recent file. In addition, it also enables me to create a "clean" sheet with no prompt characters which can be loaded in over a file in which I have already started data entry, but that I have partially destroyed in some way. Loading this sheet in over my current file restores all formulas and labels without disturbing any of the data entries and thus eliminates the need for reentry. (If prompt characters were included in this sheet they would overwrite any values which I had already entered.) My other major use for this program has been to append two or more fairly large models into one interactive model by simply "moving" one model and then loading them both into VISICALC at the same time. I hope that other VISICALC users will find this program as useful a I have.

Visicalc Files:

Visi-III Utility manipulates VISICALC III files stored as sequential text files. This is the normal way in which files are stored using the /SS command in VISICALC. Visi-III Utility will not manipulate files stored in the DIF format (Data Interchange Format) which is accessed through the use of the /S#S command. If your files are stored in the DIF format, simply load them into VISICALC and save them again using the /SS command.

VISICALC stores the coordinate name (e.g. A12), the "local" format specification (e.g. /FR), and any value, formula, or label comprising the coordinate as one record. Generally speaking, all coordinate contents following the coordinate name appear exactly as you typed them in from the keyboard. This is also true for "global" specifications and makes most records relatively easy to interpret. Each record is terminated by a (return) character. Each file (e.g. budget'82), then, is comprised of the same number of records as you have coordinates with an associated entry plus several records for "global" specifications. An entry can be comprised of nothing more than a "local" format specification. Visi-III Utility reads these records into memory a block (512 bytes at a time and then manipulates each record utilizing the string handling capabilities of Business Basic. (One particularly powerful function is the "INSTR" command which will return the location of a string within a string. This was helpful in breaking each record into its component parts.)

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VISI-/// UTILITY

Features:

Visi-III utility provides the following features —

* List entire file to crt or printer
* Remove/replace non-formula constants
* Replace any string
* Move file for subsequent appending

Operation:

After you have entered and saved the program, insert a copy of your VISICALC file disk into one drive and a blank initialized disk into the other drive. (If you have only one drive you may direct your manipulated file to the same disk as your source file — just give it a different name.) Now run the program. You will be faced with a brief title/credit page and then a menu. Before describing these menus items, the following are some general rules for their use:

— Use of upper and lower case is permissible but only upper case should be used when specifying replacement strings.

— All file specifications should use ".d" + your drive number + "/" + your file name. You may also use pathname conventions in place of the Drive number if you are familiar with them. If you need to catalog the disk first, enter "cat.d" + your drive number or "cat" + the pathname.

— To suspend/continue file processing use control 7. To terminate listing use (return) during processing and you will be returned to the menu.

— You may always return to the menu by pressing (return) after the "Source File:" prompt.

— You are always returned to the "Source File:" prompt by answering "Y" to the "Changes(Y/N)?" prompt.

1) LIST FILE TO CRT: Selecting this option allows you to print your file to your crt. Simply enter the name of the file at the prompt, press (return) and the file will list to the screen by VISICALC coordinates. Each coordinate will occupy one line. A typical coordinate specification might look like: A12:/FR1234. The A12: specifies coordinate A12. The /FR means that the "local" format for this coordinate is "right justified". Finally, the 1234 is the value which would appear at this coordinate.

2) LIST FILE TO PRINTER: This option is identical to option #1 except that the listing is also directed to your printer. If you have named your printer driver other than ".printer" you may enter the name at the prompt after "Target File:". Otherwise just press (return).

3) STRIP FILE: This allows you to completely remove or replace any constant in your file that is not part of a formula. It is this option that is used to create both types of "clean" sheets described above.

Use of this option requires the entry of both a source and target file. Next you are prompted for the characters which will replace the non-formula constant (value). The default characters are ="?. Pressing (return) will accept the default characters or you may enter your own replacement string and press (return). The = sign is the "wild card" character which means that any "local" format specification associated with the value should be retained. The "? indicates that the value should be replaced with a question mark. You may use only the = sign as the "wild card". Some examples:

Example two above represents a removal of a value with retention of the "local" coordinate specification. Examples one and three represent replacement of the value with a prompt character while retaining (ex#1) and removing (ex#3) the "local" specification. Examples four and five replace the value with a prompt character and also either replace a "local" specification which already exists (ex#4) or add one if none exists (ex#5). Stated another way, examples 1,3,4 and 5 produce a "clean" sheet with a prompt character and example 2 produces a "clean" sheet with no prompt character.

To facilitate the proper entry of these strings, the content of each coordinate in the source file is listed on the left half of the crt as it is being read from the source file and the revised content of the coordinate is listed opposite it on the right side of the crt as it is being written to the target file. (this and the following paragraph is also true of options 4 and 5.)

This option also provides the choice of being prompted before the altered contents of any coordinate is written to your target file. If you answer "Y" to the prompt "Prompting(Y/N)?" processing will stop at any coordinate which would be affected. You will hear a bell and the coordinate contents will appear on the right hand screen with a "(Y/N)?" in inverse video. A "Y" response will accept the change and write it to the target file. A "N" response will substitute the original contents of the coordinate (appearing on the left of the screen) for the altered contents and write it to the right of the screen and the target file. Pressing (esc) will terminate all further processing and return you to the menu.

ORIGINAL ENTRY	REPL CHAR(S)	REVISED ENTRY
>A12:/FR1234	="?	>A12:/FR"?
>A12:/FR1234	=	>A12:/FR
>A12:/FR1234	"?	>A12:"?
>A12:/FR1234	/FL"?	>A12:/FL"?
>A12:1234	/FL"?	>A12:/FL"?

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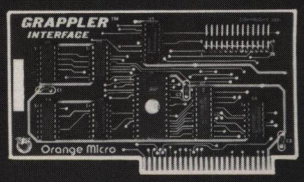

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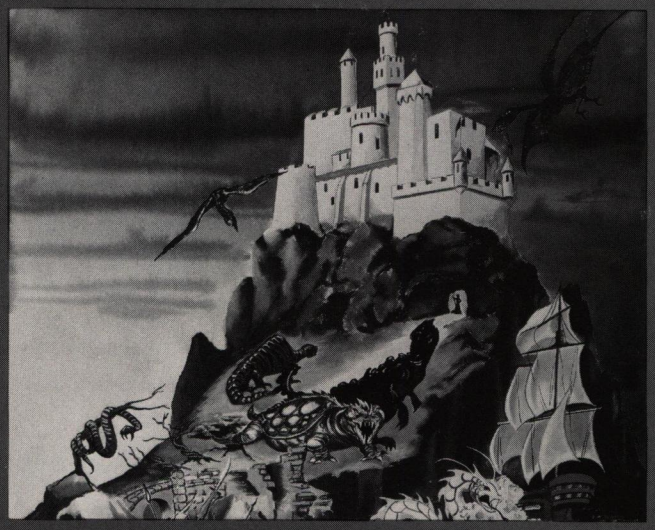

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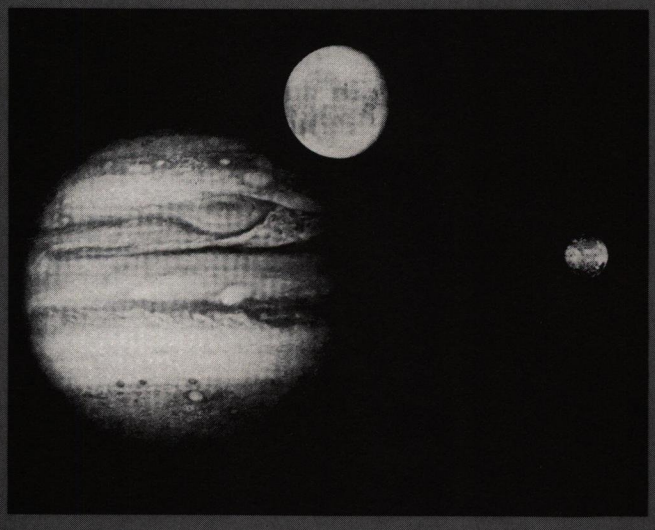

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4) MOVE FILE: This is used to move an entire file from one location on the sheet to another. It not only changes the coordinate location numbers by the amount that you wish to move the file, but it also adjusts all references to coordinates within a formula relative to the file's new location on the sheet. This can be useful when you wish to combine two separate files that would have overlapping coordinates if they were simply loaded in one after the other. This command only allows for movement by rows, not columns. For example, if you had two files which you wanted to combine, both of which started at the row #1 and extended to row #50, you could move one of the files so that it had a new starting row number of 51. They could then be loaded one after the other into VISICALC with no conflict and ultimately saved as one file.

As in option #3, you are prompted for both a source and target file. You are then asked for the starting row number of the original file and the starting row number of the new file. Just enter the row number and press (return). The only restriction here is that your new starting row number should not be so high as to force row numbers or referenced row numbers in the moved file above 256. Also, if you are moving your file less than 20 or so rows it would probably be quicker to load that file into VISICALC and use the /IR command to make room for the other file.

In addition to the normal prompting choice, this option automatically provides prompts for all "global" format specifications. These specifications are located at the end of each VISICALC file and the prompting is provided to enable their removal should you not want all or some of these specifications to override those of the file to which you are appending. A "global" format specification appears as an entry without a coordinate location prefix (e.g. /GC9). A response of "Y" to the prompt will write the specification to the target file and a "N" response will eliminate the specification. (Esc) will terminate processing. (Esc) may be used when prompted at the first "global" specification to eliminate all "global" specifications.

5) REPLACE ANY STRING: This command allows for the literal replacement of any string within a VISICALC file. As such, it can be a very powerful commmand when used properly, but care must be exercised. I have found it most useful for changing or eliminating "local" format specifications and for regaining memory space which is being used non-productively.

After entering your source and target files, you will be asked for the "String To Replace". Simply enter the string which you want replaced and press (return). You are next prompted for the "Replacement String". Again, simply enter your string and press (return). Pressing (return) with no string will cause a "NULL" replacement.

Because VISICALC will allow no more than 90 characters at any coordinate, if the replacement results in a string longer than 90 characters you will be prompted by a "String Too Long" error message in inverse video. If you press (return) in response, the original coordinate contents will be written to the target file and processing will continue. Pressing (esc) in response will terminate all processing.

One special use of this option lies in its ability to eliminate coordinates which only contain a "local" format specification and no formulas, values, or labels. This can be useful when you need to free up some memory to fit in those last few formulas. This can be done by entering the "local" format specification plus a (space) in response to the "String To Replace" prompt (e.g. FR(SPACE)(RETURN)) and entering (return) to the "Replacement String" prompt.

Some examples of this option:

ORIGINAL ENTRY	STRING TO REPL	REPL STRING	REVISED ENTRY
>A12:/FR1234	/FR	/FL	>A12:/FL1234
>A12:/FR"FY'81	'81	'82	>A12:/FR"FY'82
>A12:/FR	/FR	(RETURN)	>A12:
>A12:/FR	/FR(SPACE)	(RETURN)	

6) QUIT: This option will drop you into Business Basic. A "goto 20" will return you to the menu.

That's about all there is to it. If you have any trouble interpreting the contents of any records try referring to the reference card that came with VISICALC III. The card should also be helpful in determining the different possibilities for utilizing replacement characters.

VISI-/// UTILITY

```
1  REM

   VISI ///: A Utility for
     APPLE /// VISICALC

       by  John Mancino

Call -A.P.P.L.E. * Jan 1982


10   ON ERR GOTO 20000
15   GOSUB 15000
20   GOSUB 10000
110   IF choice%=6 THEN 6000
120   GOSUB 500
130   IF choice%=1 THEN 1000:ELSE
      GOSUB 600:GOTO 1000
500   HOME
505   VPOS=1:INVERSE:PRINT"Source
      File:";:NORMAL:PRINT CHR$(5);:INPU
      T" ";source$:IF LEN(source$)=0
      THEN 20:ELSE PRINT CHR$(6);:IF
      LEFT$(source$,3)="cat" OR
      LEFT$(source$,3)="CAT" THEN
      catpath$=source$:topleftY%=3:GOSUB
       510:GOTO 505:ELSE RETURN
510   lcdpos%=INSTR(catpath$,".d"):UCDPO
      S%=INSTR(catpath$,".D"):IF
      lcdpos%=UCDPOS% THEN PREFIX$=MID$(
      catpath$,4):GOTO 520:ELSE
      IF lcdpos%)UCDPOS% THEN prefix%=lc
      dpos%:ELSE prefix%=UCDPOS%
515   PREFIX$=MID$(catpath$,prefix%,3)
520   WINDOW 1,5 TO 80,24:PRINT
      CHR$(29):CAT :PRINT CHR$(29):WINDO
      W 1,topleftY% TO 80,24:RETURN
600   IF choice%<>2 THEN GOSUB 650:GOTO
      1000:ELSE printdriverdefault$=".pr
      inter":GOSUB 640:PRINT" ";printdri
      verdefault$;:HPOS=54:INPUT"
      ";target$:IF ASC(target$)=-1
      THEN target$=printdriverdefault$
610   VPOS=1:HPOS=55:PRINT target$:GOSUB
       660:GOTO 1000
640   VPOS=1:HPOS=42:INVERSE:PRINT"Targe
      t File:";:NORMAL:RETURN
650   GOSUB 640:INPUT" ";target$:IF
      LEN(target$)=0 THEN 650:ELSE
      PRINT CHR$(6);:IF LEFT$(target$,3)
      ="cat" OR LEFT$(target$,3)="CAT"
      THEN catpath$=target$:topleftY%=3:
      GOSUB 510:GOTO 650:ELSE CREATE
      target$, TEXT
660   OPEN#2 AS OUTPUT,target$:topleftY1
      %=5:WINDOW 1,topleftY1% TO
      80,24:HOME:RETURN
900   IF choice%=1 THEN topleftY1%=5
905   WINDOW 1,topleftY1% TO 80,24:PRINT
       CHR$(13):INVERSE:PRINT"FINISHED-
      <rtn> To Menu";:NORMAL:PRINT
      CHR$(6):CLOSE
910   GET rtn$:IF ASC(rtn$)=13 THEN
      20:ELSE 910
1000   WINDOW 1,5 TO 80,24:IF choice%=1
      THEN OPEN#2,".console"
1001   IF choice%=5 THEN null=0:HOME:INV
      ERSE:PRINT"String To Replace:";:NO
      RMAL:INPUT" ";orig$:IF ASC(orig$)=
      -1 THEN 1001:ELSE GOSUB 7000:GOSUB
       7100:INVERSE:PRINT"Replacement
      String:";:NORMAL:INPUT" ";repl$:IF
       ASC(repl$)=-1 THEN GOTO 8000:ELSE
       1004
1002   IF choice%=3 THEN HOME:INVERSE:st
      ripdeflt$="="+CHR$(34)+CHR$(63):PR
      INT"Replace Non-Formula Constant
      With:";:NORMAL:PRINT" ";stripdeflt
      $;:HPOS=35:INPUT" ";strip$:ELSE
      1005
1003   IF ASC(strip$)=-1 THEN strip$=str
      ipdeflt$:VPOS=1:HPOS=36:PRINT
      strip$:ELSE stripdeflt$=strip$
1004   topleftY1%=7:WINDOW 1,topleftY1%
      TO 80,24:GOTO 1100
1005   IF choice%<>4 THEN 1100
1010   WINDOW 1,4 TO 80,24:VPOS=1:PRINT:
      PRINT CHR$(31);:INVERSE:PRINT"Old
      Row Start:";:NORMAL:PRINT
      CHR$(5);:INPUT" ";oldrow%
1030   HPOS=42:VPOS=2:INVERSE:PRINT"New
      Row Start:";:NORMAL:INPUT"
      ";newrow%:move%=newrow%-oldrow%:PR
      INT CHR$(6):topleftY1%=7:WINDOW
      1,topleftY1% TO 80,24
1100   HOME:PRINT:INVERSE:PRINT"Changes
      (Y/N)?":GET response$:NORMAL:IF
      ASC(response$)=89 OR ASC(response$
      )=121 THEN WINDOW 1,3 TO 80,24:CLO
      SE:GOTO 120
1105   IF choice%>2 AND choice%<6
      THEN PRINT:INVERSE:PRINT"Prompting
       (Y/N)?":GET response$:NORMAL:IF
      ASC(response$)=89 OR ASC(response$
      )=121 THEN prompt%=1:ELSE
      prompt%=0
1110   HOME:OPEN#1 AS INPUT,source$
1115   ON EOF#1 GOTO 900
1120   IF choice%=2 THEN PRINT#2:PRINT#2
      ;"List of File: ";source$:PRINT#2
1140   INPUT#1;coord$:origcoord$=coord$
1141   ON KBD IF KBD=13 THEN CLOSE:GOTO
      20
1145   IF choice%>2 AND choice%<6
      THEN WINDOW 1,topleftY1% TO
      39,24:PRINT coord$
1150   IF choice%=3 THEN 3000
1160   IF choice%=4 THEN 4000
1170   IF choice%=5 THEN 5000
1200   IF choice%=1 OR choice%=2
      THEN PRINT coord$:IF choice%=2
      THEN PRINT#2;coord$:GOTO 1140:ELSE
       1140
1210   IF choice%>2 AND choice%<6
      AND prompt%=0 THEN GOSUB 1290:GOTO
       1140
1215   IF choice%=5 AND LEN(coord$)-INST
      R(coord$,":")>90 THEN WINDOW
      42,topleftY1% TO 80,24:PRINT
      LEFT$(coord$,INSTR(coord$,":"))+"
      ";:INVERSE:PRINT CHR$(7)+"String
      Too Long- <esc> To Abort,
      <rtn> To Continue";:NORMAL:ELSE
      1220
1216   PRINT CHR$(29);:GET response$:res
      ponse%=ASC(response$):IF response%
      =27 THEN 20:ELSE IF response%=13
      THEN HPOS=1:VPOS= VPOS-1:GOSUB
      1255:PRINT origcoord$:PRINT#2;orig
      coord$:GOTO 1140
1220   IF origcoord$=coord$ THEN
      GOSUB 1290:GOTO 1140
1230   WINDOW 42,topleftY1% TO 80,24:PRI
      NT coord$+" ";:INVERSE:PRINT
      CHR$(7)+"(Y/N)?";:NORMAL:PRINT
      CHR$(29);:GET response$:response%=
      ASC(response$)
```

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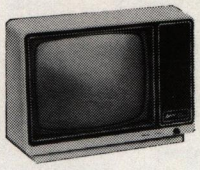

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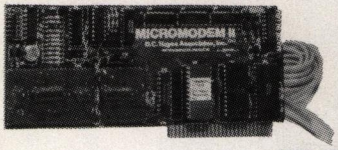

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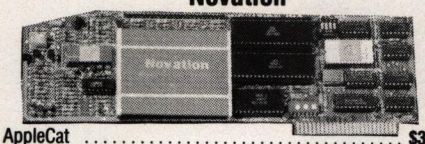

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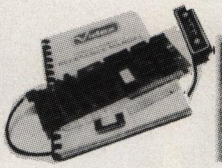

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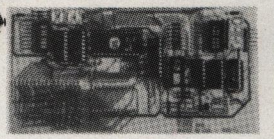

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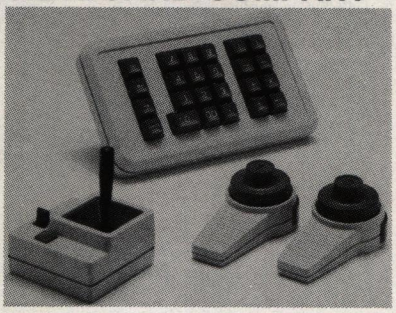

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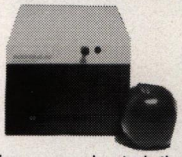

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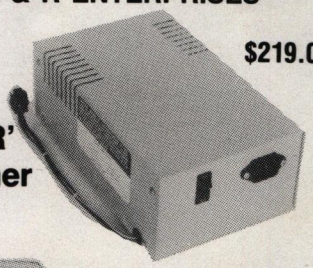

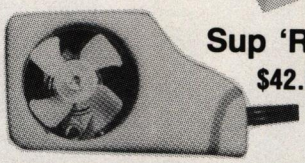

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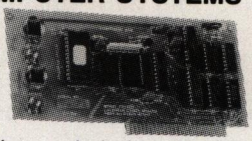

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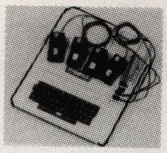

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VISI-/// UTILITY

```
1235  IF response%=78 OR response%=89
      OR response%=110 OR response%=121
      THEN 1240:ELSE IF response%=27
      THEN CLOSE:GOTO 20:ELSE 1230
1240  IF response%=78 OR response%=110
      THEN GOSUB 1250:PRINT origcoord$:P
      RINT#2;origcoord$:GOTO 1140:ELSE
      GOSUB 1250:PRINT coord$:PRINT#2;co
      ord$:GOTO 1140
1250  HPOS=1:IF LEN(coord$)>31
      AND LEN(coord$)<71 THEN VPOS=
      VPOS-1:ELSE IF LEN(coord$)>70
      THEN VPOS= VPOS-2
1255  PRINT CHR$(29);:RETURN
1290  PRINT#2;coord$:WINDOW 42,toplefty
      1% TO 80,24:PRINT coord$:RETURN
1300  coordchar$=MID$(coord$,charcount%
      ,1):RETURN
1400  IF ASC(LEFT$(stripdeflt$,1))=61
      AND INSTR(coordaccum$,"/")>0
      THEN coordaccum$=LEFT$(coordaccum$
      ,INSTR(coordaccum$,"/")+2):ELSE
      coordaccum$=LEFT$(coordaccum$,INST
      R(coordaccum$,":")):GOTO 1450
1410  stripdeflngth%=LEN(stripdeflt$)-1
      :IF stripdeflngth%>0 THEN
      strip$=RIGHT$(stripdeflt$,stripdef
      lngth%):ELSE strip$=""
1450  coordaccum$=coordaccum$+strip$:co
      ord$=coordaccum$:GOTO 1200
1500  coordaccum$=coordaccum$+coordchar
      $:charcount%=charcount%+1:GOSUB
      1300:RETURN
1600  IF ASC(coordchar$)=47 THEN
      GOSUB 1500:IF ASC(coordchar$)=45
      THEN POP:GOTO 1200:ELSE GOSUB
      1500:GOSUB 1500:formatendflag%=1:R
      ETURN:ELSE RETURN
3000  coordaccum$="":charcount%=1:locen
      dflag%=0
3001  GOSUB 1300
3002  ON locendflag% GOTO 3007
3004  IF ASC(coordchar$)=58 THEN
      locendflag%=1:GOTO 3050:ELSE
      3050
3007  GOSUB 1600
3009  IF charcount%>LEN(coord$)
      THEN 1200
3010  IF ASC(coordchar$)=34 OR
      ASC(coordchar$)=43 THEN 1200
3030  IF ASC(coordchar$)>64 AND
      ASC(coordchar$)<91 OR ASC(coordcha
      r$)=47 THEN 1200:ELSE GOSUB
      3060:IF charcount%>LEN(coord$)
      THEN 1400:ELSE 3030
3050  coordaccum$=coordaccum$+coordchar
      $:charcount%=charcount%+1:IF
      charcount%>LEN(coord$) THEN
      1200:ELSE 3001
3060  charcount%=charcount%+1:GOSUB
      1300:RETURN
4000  coordaccum$="":coordvalue$="":cha
      rcount%=1:formatendflag%=0:GOSUB
      1300:IF ASC(coordchar$)<>62
      THEN origcoord$="":GOTO 1230
4005  GOSUB 1300
4010  ON formatendflag% GOTO 4030
4020  GOSUB 1600
4030  IF ASC(coordchar$)=34 THEN
      4100:ELSE IF ASC(coordchar$)>64
      AND ASC(coordchar$)<91 THEN
      4050:ELSE GOSUB 1500:IF charcount%
      >LEN(coord$) THEN coord$=coordaccu
      m$:GOTO 1200:ELSE 4010
```


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```
4050  GOSUB 1500:IF ASC(coordchar$)>48
      AND ASC(coordchar$)<58 THEN
      4200:ELSE 4010
4100  GOSUB 1500:IF charcount%>LEN(coor
      d$) THEN coord$=coordaccum$:GOTO
      1200:ELSE 4100
4200  coordvalue$=coordvalue$+coordchar
      $:charcount%=charcount%+1:GOSUB
      1300:IF ASC(coordchar$)>47
      AND ASC(coordchar$)<58 THEN
      4200
4210  coordnumber%=VAL(coordvalue$):coo
      rdnumber%=coordnumber%+move%:coord
      value$=STR$(coordnumber%):coordacc
      um$=coordaccum$+coordvalue$:IF
      charcount%>LEN(coord$) THEN
      coord$=coordaccum$:GOTO 1200:ELSE
      coordvalue$="":GOTO 4010
5000  IF INSTR(coord$,orig$))=1
      THEN IF RIGHT$(coord$,3)=RIGHT$(OR
      IG$,3) AND null=1 THEN 1140:ELSE
      IF null=0 THEN length=LEN(coord$)-
      INSTR(coord$,orig$)-LEN(orig$)+1:I
      F length<1 THEN en$="":ELSE
      en$=RIGHT$(coord$,length):ELSE
      1200:ELSE 1200
5010  start$=LEFT$(coord$,INSTR(coord$,
      orig$)-1):coord$=start$+repl$+en$:
      GOTO 1200
6000  TEXT:HOME:PRINT"BYE! (GOTO
      20 TO RESUME)":END
7000  IF ASC(RIGHT$(orig$,1))=32
      THEN null=1:orig$=LEFT$(orig$,LEN(
      orig$)-1):RETURN:ELSE RETURN
7100  WINDOW 42,5 TO 80,24:HOME:RETURN
```

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```
8000  HPOS=62:VPOS=1:PRINT CHR$(34)+"NU
      LL"+CHR$(34):GOTO 1003
10000 TEXT:HOME:INVERSE:VPOS=1:HPOS=32
      :PRINT" Visi III Utility "
10002 WINDOW 1,3 TO 80,24:VPOS=3:PRINT
      "Select:":NORMAL:VPOS=7:PRINT"1.
      List File To CRT":PRINT:PRINT"2.
      List File To PRINTER":PRINT:PRINT"
      3. Strip File":PRINT:PRINT"4.
      Move File":PRINT:PRINT"5.
      Replace String":PRINT:PRINT"6.
      Quit"
10005 VPOS=3:HPOS=9:PRINT CHR$(5);CHR$
      (31);:GET choice$:PRINT choice$:ch
      oice%=VAL(choice$):PRINT CHR$(6)
10010 IF choice%<1 OR choice%>6
      THEN PRINT CHR$(7):GOTO 10005:ELSE
       RETURN
15000 TEXT:HOME:INVERSE:VPOS=6:HPOS=31
      :PRINT" Visi III Utility ":PRINT:P
      RINT:PRINT:HPOS=39:NORMAL:PRINT"By
      ":HPOS=34:PRINT"John Mancino":PRIN
      T:PRINT:PRINT:HPOS=32:PRINT"1780
      55th Street"
15030 HPOS=31:PRINT"Boulder, Colorado"
      :PRINT:HPOS=30:PRINT"ALL RIGHTS
      RESERVED"
15050 FOR I=1 TO 4000:NEXT:RETURN
19000 VPOS=13:HPOS=0:PRINT CHR$(29):RE
      TURN
19050 PRINT CHR$(29):INVERSE:VPOS=row:
      HPOS=(80-LEN(PR$))/2:PRINT
      PR$:NORMAL:RETURN
20000 term=0:IF VPOS=3 THEN PRINT
      CHR$(13):GOTO 1010
20030 IF VPOS=4 THEN PRINT CHR$(13):GO
      TO 1030
20050 IF ERR=33 THEN pr$="FILE
      ALREADY EXISTS":row=13:GOSUB
      19050:PRINT:GOSUB 20090:row=15:GOS
      UB 19050:GET response$:GOSUB
      19000:IF ASC(response$)=13
      THEN DELETE target$:GOTO 660:ELSE
      IF ASC(response$)=27 THEN
      130:ELSE 20050:ELSE 20100
20090 pr$="<rtn> TO OVERWRITE,
      <esc> TO RESTART":RETURN
20100 IF ERR=17 THEN pr$="STRING
      TOO LONG"
20200 IF ERR=25 THEN pr$="I/O
      ERROR"
20300 IF ERR=27 THEN pr$="WRITE
      PROTECTED"
20400 IF ERR=28 THEN pr$="DISK
      SWITCHED"
20500 IF ERR=29 THEN pr$="BAD
      PATH"
20600 IF ERR=30 THEN pr$="FILE
      NOT FOUND"
20700 IF ERR=31 THEN pr$="PATH
      NOT FOUND
20750 IF ERR=32 THEN pr$="VOLUME
      NOT FOUND"
20800 IF ERR=34 THEN pr$="DISK
      FULL"
20900 IF ERR=35 THEN pr$="FILE
      LOCKED"
20990 IF ERR<>17 AND ERR<25 OR
      ERR>35 THEN PR$="ERROR# "+STR$(ERR
      ):term=1
21000 row=13:WINDOW 1,6 TO 80,24:HOME:
      GOSUB 19050:IF term=1 THEN
      END:ELSE PRINT:pr$="<rtn>
      TO CONTINUE":row=15:GOSUB
      19050:GET e$:IF ASC(e$)=13
      THEN CLOSE:GOTO 20:ELSE 21000
```

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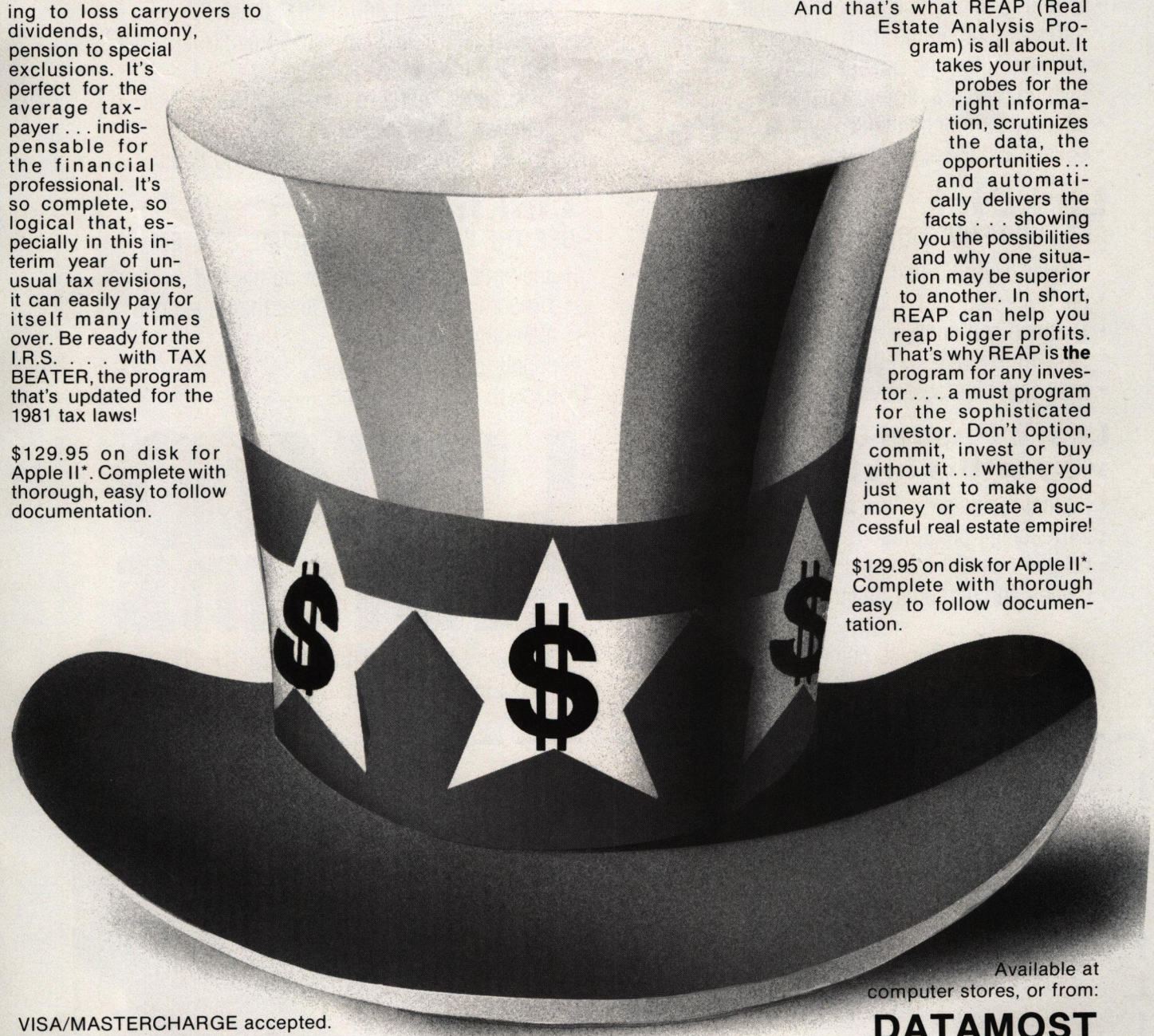

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SELECTION OF A DISK SYSTEM

By Dan Paymar

THIS article discusses the pros and cons of various types of add-on disk systems for a personal computer. Although the author was prompted into writing this as a result of a search for a disk system for his own Apple-II system, the points discussed apply equally to any computer system.

As we put more and more applications on a computer, whether they are business or scientific applications or games, we invariably reach a point where more on-line storage is needed or desired. Most personal computer users start with cassette tape and "graduate" to 5¼ floppy diskettes, but many of us soon want more capacity and speed, as well as better reliability.

My search for a larger disk system has led to much frustration. It seems that at the time this article is being written no system is yet available that meets all of my criteria, which follow:

1. High data integrity.
2. High reliability.
3. Good back-up capability.
4. Easily maintained.
5. Compatibility with existing operating systems.
6. DMA data transfer and interrupt capabilities.
7. Large storage capacity.
8. Quiet operation.
9. Cost effective.

These criteria are presented in order of most desirable first. This is from my own viewpoint, of course, but my opinions are the result of over twenty years experience in the computer field, most of it directly related to disk system use and selection. You will note that, to me, data integrity and related characteristics are of utmost importance, while compatibility with software follows closely. High capacity, which prompted the search in the first place, ended up low on the list only because the other criteria are so important.

Although cost considerations wound up at the bottom of the list, cost is still an important factor to most of us. However, if your inclination is to put price at the top of the list, then you should consider this article very carefully before making your selection of a disk system; this is because the initial price may be only a small part of the cost of owning and operating a disk system.

Now let's examine each of these criteria, both individually and as related to the others.

1. High data integrity means that the probability of an irrecoverable data loss is extremely low. To some extent, this is dependent upon reliability and backup capabilities (2 and 3 below), but other factors make data integrity somewhat independent. For example, is it susceptible to power line noise or low line voltage (brown-outs)? In a dusty location, consider whether it's sealed or if the circulated air is well filtered. In a damp climate, what about vulnerability to high humidity? In a very dry climate, what about vulnerability to static electricity?
2. In the search for a highly reliable system, I reluctantly have to look at the 8" Winchester drives with a somewhat jaundiced eye. The reason is simply that many of these drives are too new to have a proven reliability record. Not all of these drives are truly Winchester technology. Although the sealed evnironments will definitely reduce contamination of the disk surfaces and heads, it does not guarantee that they are well designed for a long and trouble-free life; only many millions of hours of use will determine that. I have seen too many problems with various high density recording systems, so I decided that I would not select a drive that had not been in wide use for at least two years.
3. Good back-up capability implies a changeable cartridge. The sealed hard disk systems can be backed up only by copying to floppy diskettes or to cassette tape. Dozens, or even hundreds, of diskettes or cassettes would be required to back up a Winchester disk. Selective back-up (backing up only the files that have changed recently) is viable, but requires extensive record keeping, and no software is yet provided to do this. A 3M tape cartridge drive might be a viable back-up system, but this currently would add perhaps another $1000 to the cost of a system. One company now offers an interface to a home video tape recorder for backup purposes.
4. To be easily maintained, schematics must be supplied with both the disk drive and the controller/interface, along with a commented listing of the software driver. Also, if the controller is micro-programmed, then source listings of the firmware are necessary. Even if you can't service the hardware yourself, what would you do if the manufacturer went out of business? The warranty would become worthless, but with the schematics you can take it to any competent computer service center. Many companies are understandably reluctant to supply schematics, but it may be possible to resolve this by offering to sign a proprietary information agreement. This is your personal guarantee that the schematics will be used only for maintenance of the equipment and not in the design of competing equipment. The only alternative that I would accept to complete schematics would be that the systems are being built and maintained by a very well established firm. Many suppliers in the personal computer market have an excellent track record, but remember that several good companies have gone out of business recently.

SELECTION OF A DISK SYSTEM

5. Compatiblity with existing operating systems is of utmost importance to most users, since few have the experience or inclination to modify the operating system to work with a new disk system. Happily, most disk system manufacturers supply a modified disk operating system (DOS) with their controller. There is some question of the legality of this, however, since the DOS is usually copyrighted by the computer manufacturer. It seems to me that some computer manufacturers may be in jeopardy of losing their DOS into the public domain by not attempting to enforce their copyright. On the other hand, their computer sales might be adversely affected by such enforcement, as much of the attractiveness of such systems is the ability to attach a variety of peripherals. In any case, there seems to be a wide variation in efficiency in these modified systems; therefore, I would insist on source listings of the modifications to the DOS. Also, some disk systems offered for the Apple work with DOS, but not yet with the Language System (Pascal).
6. The DOS supplied with some personal computers (including the Apple) does not now require Direct Memory Access (DMA or "cycle stealing") data transfer, or the use of interrupts. I don't expect this to remain true for much longer as independent software houses begin to supply more powerful operating systems. The use of these features is mandatory for an efficient time-sharing system. Major hardware purchases should not be made without considering future uses. Most high capacity disk controllers use DMA, but few use interrupts.
7. Parkinson's Law states that "work expands so as to fill the time allotted for its completion, and expenditures expand to meet income". I would add a corollary stating that "data expands so as to fill the available storage space." It's only a matter of time until you will feel crowded in whatever amount of storage you have. The only difference is that it takes longer to fill a large disk, but then it's more difficult to determine which files can be deleted. The best advice I can give here is to plan ahead and keep records.
8. Quiet operation is a must in most homes and businesses, since a whining disk drive and noisy fans are not conducive to good working conditions. Also, some of us are inclined to continue our programming efforts while the rest of the family sleeps. Most of the smaller disk drives are reasonably quiet, but the larger ones (e.g. some of the storage module types) can be very noisy.
9. The importance of cost is different for each of us. While I am concerned about price, I am more concerned with overall cost effectiveness. In other words, what is the least that I can spend in the long run and still meet my other criteria? Your criteria may be different from mine, and you may judge the relative importance differently, but the main point that I am trying to make is that you should know your own criteria before making a selection. Media and maintenance costs must be included, as well as the potential cost of lost data.

After determining my criteria, I started looking around. It seems that there are three basically different approaches offered by various manufacturers:

A. 8" floppy drives with controller and power supply.
B. 8" sealed hard disk drive with controller and power supply.
C. Controller for "Diablo-type interface" drives.

Some shopping around revealed that used Diablo model 31 disc drives are available for about $600 to $1000 each, plus a power supply at about $100 to $260 which can handle two drives. While the 31 is now "obsolete" (it spins at 1500 RPM and holds "only" 1.25 or 2.5 Megabytes per drive, depending upon the actual model), it is very quiet and very reliable. This seemed like the best solution to my needs until I found out the manufacturer of the controller wouldn't (or couldn't) interface to the 1.25 Megabyte model, and absolutely refused to supply schematics.

I have already discussed my reluctance to choose a "Winchester" system, and some of the currently available 8" floppy systems still are only single-sided, single-density in spite of the small cost increment to go double-density. The capacity of a single-density 8" floppy is only about twice the capacity of the Apple's 5¼" floppies, so their cost effectiveness is questionable. A double-sided, double-density 8" floppy system might be a different story.

As of this writing, I have not yet selected a new disk system. This does not mean that the currently available systems are not good; in fact, some of them are quite good. It's just that they don't meet enough of my own selection criteria. By the time you read this, however, some of the 8" hard disk systems will have been around long enough to establish a track record and have good back-up facilities, and several new systems, both hard and floppy, will probably be available.

Your best strategy in selecting a disk system, or any large purchase for that matter, is to first list your own criteria. Read the ads and the specific product review articles carefully, and write to the manufacturers for more information. Then select a reputable supplier before shelling out your hard-earned money. Note that a local store may charge a slightly higher price than a mail order house, but it may be worth it if they help you out when a problem occurs.

I would appreciate hearing from anyone who has had any experience, good or bad, with available disk systems for the Apple-II. Also, any manufacturer who feels that their product might satisfy my needs. Write to me at 91 Pioneer Place, Durango, CO 81301.

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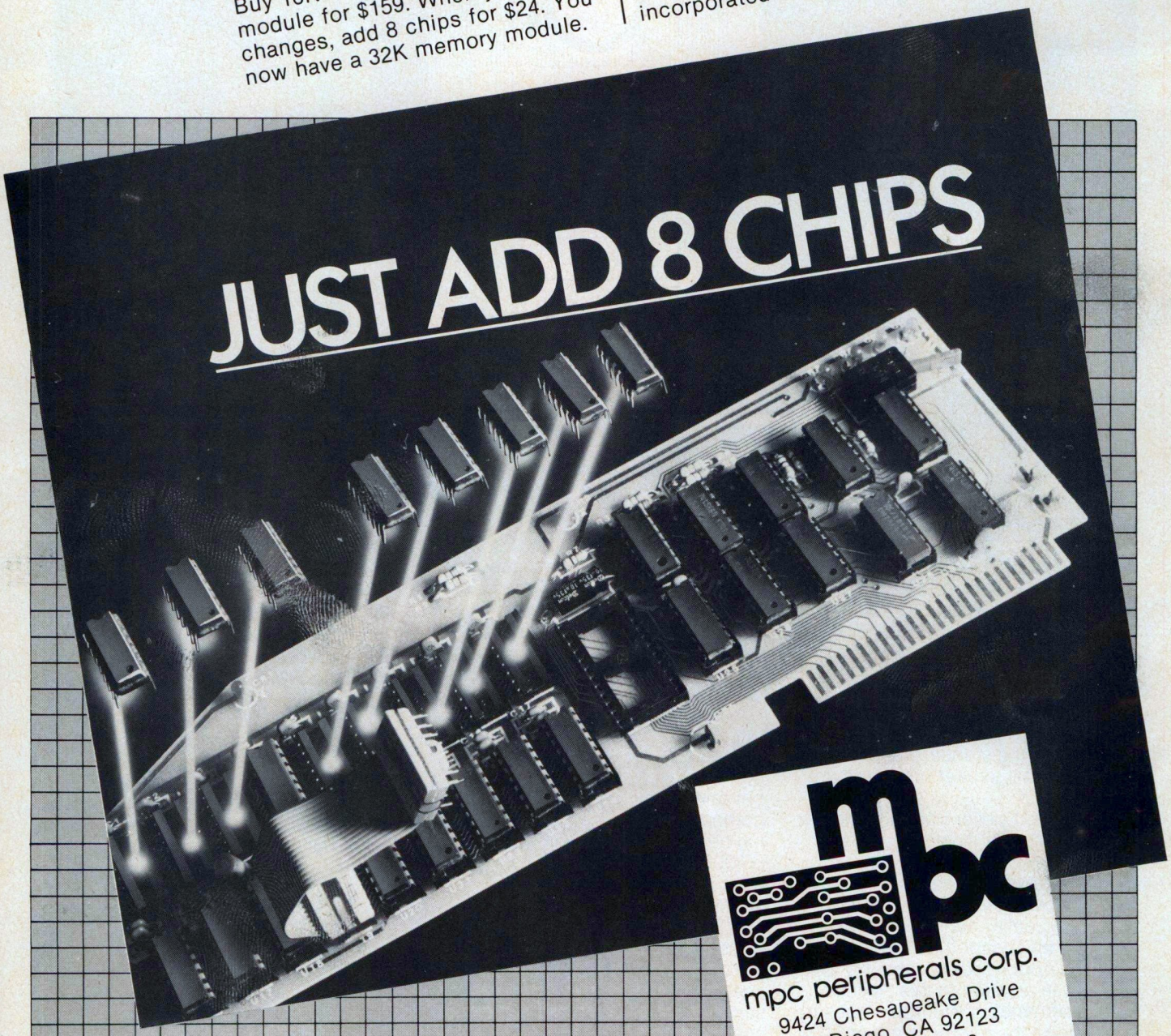

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NOTES FROM A NOVICE:

CUSTOMIZING APPLE PIE

By Charles W. Rusch/Call —A.P.P.L.E. Staff Writer

WONDER of wonders! Based upon my last "Notes from a Novice" article, I've been asked to do a regular column for novices. Actually, "asked" is a bit misleading, I sort of insisted, and Val, being a shrewd and intelligent sort, agreed. So here we are, in Notes #2. Last time I told you, step-by-step, how to reconstruct a disk with a blown catalog track. I trust that, in the meantime, you all had an opportunity to clobber a few disks to see if you could, in fact, reconstruct them.

The big piece this month is on how to customize your Apple PIE keyboard. If you don't own or use Apple PIE, there'll be other medium level tricks gathered from here and there to keep you reading, like using your ROM Card in slot 2, recovering 11 sectors of disk storage which DOS doesn't use, a quick look at a couple of new peripherals, and more. This will all be buried in among the ramblings of a novice in awe of a new field. Hop aboard; even if you're an old-hand you might enjoy the ride.

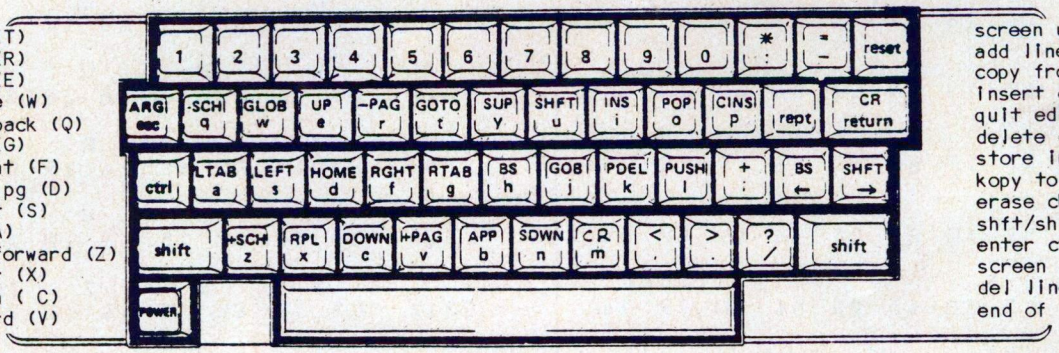
I am hoping this will be a column with a lot of reader response, particularly from those of you who have owned your Apples less than a year. I know it's harder getting going than you were probably led to believe, but maybe we can help each other by exchanging answers and ideas through this column. So ask me your questions, and I'll give it a go. But first you will need to know something about my set-up (although questions beyond what I personally own are okay too).

I have an Apple II+ with DOS 3.3 in ROM, two drives, and a black and white monitor. Occasionally I hook up the family TV to get some color. Because I do a lot of word processing, I recently got a VIDEX Videoterm 80 column board with the Keyboard and Display Enhancer and the Softvideo Switch. All that means is that I can use my Apple keyboard as I would a typewriter and get 80 columns on the screen if I want. The software I use most is Apple PIE for text processing, DB Master for a data base program, and PLE (Program Line Editor) when I am programming. I like them all a lot, and have gotten to the point in their use where I think of them as old friends who are there to help me in my work. I recently borrowed a RamCard and some Pascal disks to learn the Pascal operating system and do some work using the Pascal editor. I was most impressed, and will probably be buying my own Pascal set-up soon, even though I know next to nothing about programming in Pascal (so far). The point of all this is that I would be happy to engage questions about the use of any of the above equipment and programs. Those questions I can already answer will be easy; the rest will help me in my own development.

As I said last time, I read a lot of magazines on microcomputers, and have seen a goodly number of articles on word-processors for the Apple. It is not my place to plug any particular product in this column nor even to review products, but I would like to spend a large part of this article on the Apple PIE editor from Programma (now defunct) because it is one of the most powerful editors for the unmodified Apple you can buy, particularly for the money. It has a reputation, largely deserved, of being somewhat difficult to learn, which I think qualifies it even more for coverage in a column for novices. There have been many articles written for Apple Writer, but few for Apple PIE, although it has been around almost as long and is a much more powerful editor.

PIE FUNCTION REFERENCE CHART (1)

goto/jump (T)
page back (R)
cursor up (E)
global mode (W)
find str, back (Q)
tab right (G)
cursor right (F)
HOME/begin pg (D)
cursor left (S)
tab left (A)
find str, forward (Z)
replace str (X)
cursor down (C)
page forward (V)


1 2 3 4 5 6 7 8 9 0 * : = - reset
ARG esc -SCH q GLOB w UP e -PAG r GOTO t SUP y SHFT u INS i POP o CINS p rept CR return
ctrl LTAB a LEFT s HOME d RGHT f RTAB g BS h GOB j PDEL k PUSH l + ; BS ← SHFT →
shift +SCH z RPL x DOWN c +PAG v APP b SDWN n CR m < , > . ? / shift
POWER

screen up (Y)
add line (I)
copy from buffer (O)
insert char (P)
quit editor (@)
delete char (J)
store in buffer (K)
kopy to buffer (L)
erase char/BS (←,H)
shft/shft lock (→,U)
enter ctrl char (↑M)
screen down (N)
del line (↑N)
end of line (B)

NOTES FROM A NOVICE

In my opinion, from the reviews I have read, the Apple PIE/FORMAT combination has been consistently underrated in the reviews. I have been using it for eight months now and I have yet to use all of its advanced features. In a moment, I'll go into one of those features — redesigning the keyboard to put the control keys where you want them rather than where Programma put them. You can do that, and it's fairly easy. For right now, just let me say that with Apple PIE you can perform all the normal editing functions, like inserting and deleting pages of text, making paragraph moves, as well as finding and replacing letters, words, and phrases, all while whipping the cursor around the screen with amazing ease. You can also learn, in the advanced section, how to chain text files together so that they are automatically read to the printer, in order, or appended to one another on disk, or in memory. You can insert blocks of text automatically from one file into another, edit programs written in BASIC, program some of your own commands, and reconfigure your keyboard. There are reportedly around 150 commands in the PIE/FORMAT combination to do your professional bidding, but with a dozen or so, you can be in business for something like letter-writing or a term paper. To get a comparable program for the Apple you have to get one of the CP/M packages that are available with the Softcard and a bunch of money. What you get with PIE/FORMAT is a terrific program for the dollars ($130 as of this writing); what I didn't get from Programma was customer service . that one up). But then nobody's perfect.
(and perhaps that is one reason they are now out of business).*
are now out of business).* But then nobody's perfect.

Okay, here's how to customize your keyboard. First, let me say that I am not talking about changing the layout of the letter keys from the "QWERTY" keyboard to some other more sensible arrangement, however much you'd like to do that. Sorry. What I'm talking about is rearranging the command keys or the control characters. By so doing, you can, for example, put the cursor moves into almost any arrangement you may prefer. If you are fond of Applesoft's ESC I,J,K,M arrangement, I can show you how to approximate that with control characters (see Figure 2 and Chart 2, below). Or if you like the increasingly popular CTRL— W,A, S,Z placement, you can put your cursor moves over there. In fact, you can put them almost anywhere you want.

You may wonder why one would bother. After all, presumably someone with a lot of intelligence already figured out a pretty sound arrangement; why mess it up, or reinvent it? Well, notice that that same someone with a lot of intelligence also made it possible to change the arrangement, and probably did so because he knew people are different with different preferences and different use patterns for programs. For example, I found that I wanted to move the HOME key, CTRL—D, the first time I went for one of the single move cursor keys which surround it, hit CTRL-D by mistake, and suddenly found the cursor up in the corner. I also didn't like CTRL/SHFT—N, the line delete key, being next to CTRL/SHFT—M, the control character insert key, particularly after deleting a few lines unintentionally. More importantly, however, is that as I began using more and more programs each with their own control keys, it became harder and harder to remember which key did what. DB Master and PLE use CTRL—F and CTRL—D to find and delete, respectively, while PIE does not. PLE uses the arrow keys to zip the cursor back and forth along the line, and CTRL—I to insert characters, but not PIE. When I started to use the Pascal editor, I had to learn still another set of control keys. You get the idea.

Figure 1

```
          @     A     B     C
12A0   8F 1B 88 20 B3 19 C8 2B

          D     E     F     G
12A8   07 20 B6 2B D1 2B 82 1F

          H     I     J     K
12B0   C0 18 14 1B F3 18 D0 19

          L     M     N     O
12B8   DB 23 93 2C 0A 23 2D 24

          P     Q     R     S
12C0   B5 1F AC 1C 16 19 EB 2B

          T     U     V     W
12C8   5F 1C CE 25 36 19 AF 25

          X     Y     Z    esc
12D0   C3 1E 65 23 56 1D 79 16

        n/a    ^M    ^N    n/a
12D8   87 14 C1 25 F1 19 87 14
```

```
          @     A     B     C
12E2   8F 1B F4 21 94 1A EF 20

          D     E     F     G
12EA   56 21 2A 21 B1 21 D9 21

          H     I     J     K
12F2   C0 18 B6 22 A4 19 2E 22

          L     M     N     O
12FA   D8 23 DF 1F 0A 23 2D 24

          P     Q     R     S
1302   B5 1F AC 1C 16 19 C4 21

          T     U     V     W
130A   5F 1C CE 25 66 1B AF 25

          X     Y     Z    esc
1312   C3 1E 65 23 56 1D 79 16

        n/a    ^M    ^N    n/a
131A   87 14 C1 25 87 14 87 14
```

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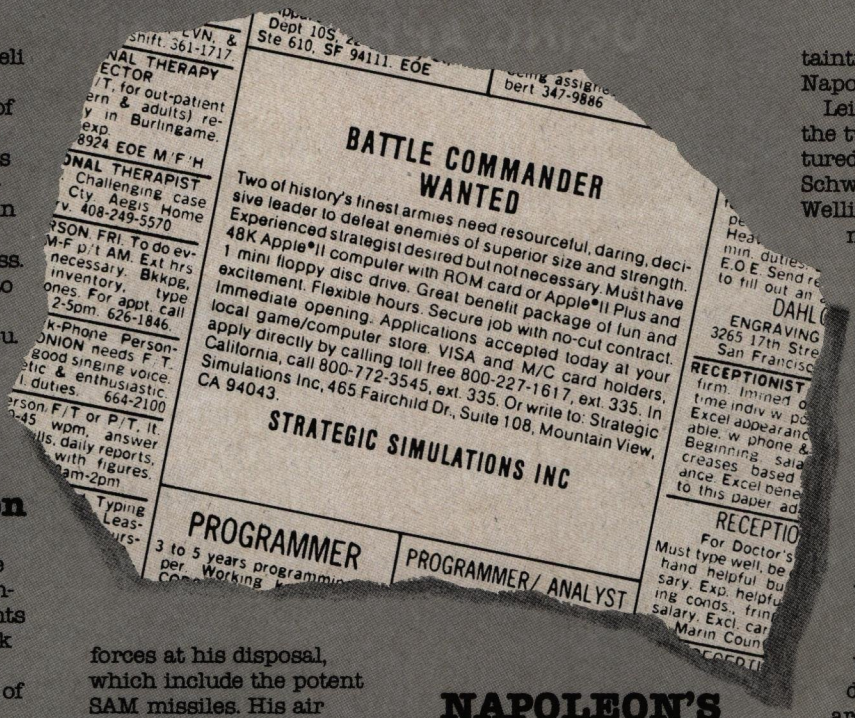
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We were faced with this same question when a custom package we wrote crashed after working for six months. The package had two hundred interacting programs. Was it Software or Hardware?

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APPLE-CILLIN is entirely written in assembly language. Simply boot the disk like a master or slave disk. Once APPLE-CILLIN is booted everything is done from Menu choices. The test results are displayed in EASY TO UNDERSTAND form.

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APPLE-CILLIN is supplied on BOTH sides of a diskette. One side works with 13 SECTOR and the other with 16 SECTOR drives. It comes with an instruction manual, but APPLE-CILLIN is so easy to use that you will probably never read the manual.

WHAT ARE THE HARDWARE REQUIREMENTS?

APPLE-CILLIN will work on -ANY- Apple II or Apple II+ with 48K of RAM and ONE or more Disk Drives.

HOW DO YOU GET APPLE-CILLIN?

APPLE-CILLIN can be ordered at your local computer store, or send $39.95 to XPS, Inc., 323 York Road, Carlisle, Pa. 17013 (Pa. residents add $2.40 sales tax.)

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XPS, Inc. **Phone (717) 243-5373 (Pennsylvania calls)**
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NOTES FROM A NOVICE

Now I know that not everyone uses the same particular combination of programs I do, but that is the point — with PIE you can customize your keyboard, and get it just the way *you* want it. I have now tried out about 10 different arrangements and have finally settled on one that, in my opinion, combines the best features of all the above programs and is easier to learn and remember to boot. And today, friends, you get it absolutely FREE! In fact, because I know you're all different out there, I am going to give you TWO (count 'em, 2) well-considered alternative arrangements to the standard Apple PIE keyboard.

The first thing to do to reconfigure your keyboard, is to turn to section 18.0 of your Apple PIE manual. In my manual, section 18.0 is entitiled, COMMAND TABLES, and is on page 71. Skip over all that stuff that says you ought to be a "sophisticated user familiar with machine language", and read the rest of the page. Don't worry if you do not understand it all; I'll explain it carefully. The idea is a simple one: there are 26 letters in the alphabet, and 26 letter keys on your keyboard. There is also an ESC key that is addressable, and three SHFT keys: N, M, and P, which comes to a total of 30 keys which can be used as control keys. If all those keys are preceded by an ESC key, another 30 keys become available. PIE uses almost all 60 of them, plus all FORMAT's fancy commands, and thereby derives both its power and its complexity.

PIE hooks the 60 keys to command routines by means of two address tables which are part of the program file named, APPLE PIE. Each table is a 4 X 8 matrix of 32 locations, and the control characters are assigned to the matrix in the same order that they are listed on page 138 of your *Apple Programming Reference Manual.* Each table starts with CTRL—@, and goes through all 30 keys plus the two n/a's (not/assigned, also on the list).

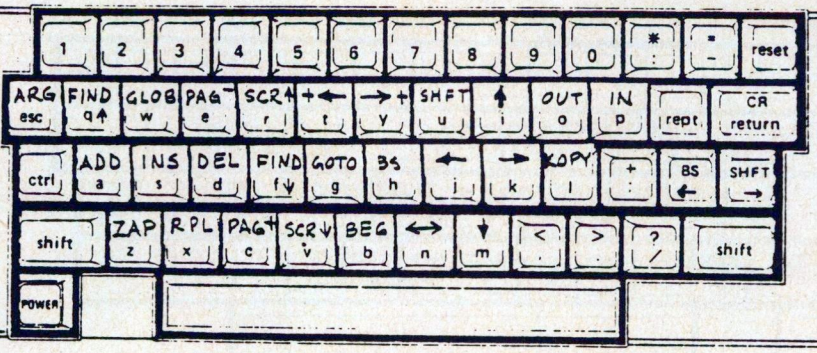
Figure 2

```
          @     A     B     C
12A0   8F 1B  14 1B  07 20  36 19

          D     E     F     G
12A8   F3 18  16 19  56 1D  5F 1C

          H     I     J     K
12B0   C0 18  B6 2B  EB 2B  D1 2B

          L     M     N     O
12B8   DB 23  93 2C  B3 19  D0 19

          P     Q     R     S
12C0   2D 24  AC 1C  65 23  B5 1F

          T     U     V     W
12C8   88 20  CE 25  0A 23  AF 25

          X     Y     Z    esc
12D0   C3 1E  82 1F  F1 19  79 16

        n/a    ^M    ^N    n/a
12D8   87 14  C8 2B  C1 25  87 14
```

```
          @     A     B     C
12E2   8F 1B  B6 22  56 21  66 1B

          D     E     F     G
12EA   A4 19  16 19  56 1D  5F 1C

          H     I     J     K
12F2   C0 18  2A 21  C4 21  B1 21

          L     M     N     O
12FA   D8 23  DF 1F  94 1A  2E 22

          P     Q     R     S
1302   2D 24  AC 1C  65 23  B5 1F

          T     U     V     W
130A   F4 21  CE 25  0A 23  AF 25

          X     Y     Z    esc
1312   C3 1E  D9 21  87 14  79 16

        n/a    ^M    ^N    n/a
131A   87 14  EF 20  C1 25  87 14
```

PIE FUNCTION REFERENCE CHART (2)

tab left (T)
screen up (R)
page back (E)
global mode (W)
find str, back (Q)
goto/jump (G)
find str, forward (F)
delete char (D)
Insert char (S)
add line (A)
zap line (Z)
replace str (X)
page forward (C)
screen down (V)


1 2 3 4 5 6 7 8 9 0 * = reset
ARG esc FIND q↑ GLOB w PAG e SCR↑ r ←+ t →+ y SHFT u ↑ i OUT o IN p rept CR return
ctrl ADD a INS s DEL d FIND f↓ GOTO g BS h ← j → k KOPY l + ; BS ← SHFT →
shift ZAP z RPL x PAG↓ c SCR↓ v BEG b ↔ n ↓ m < , > . ? / shift
POWER

tab right (Y)
cursor up (I)
store in buffer (O)
copy from buffer (P)
quit editor (@)
cursor left (J)
cursor right (K)
kopy to buffer (L)
erase char/BS (←,H)
shft/shft lock (→,U)
cursor down (↑M)
end of line (N)
enter ctrl char (↑N)
begin pg/HOME (B)

NOTES FROM A NOVICE

Then the list starts all over with the same characters assigned to a second table for those commands in which the control key is to be preceded by the ESC key (or what PIE calls ARG for 'enter argument'). The two tables, as arranged in the original unmodified APPLE PIE program, are shown in Figure 1. Note that I have written above each two-byte address the corresponding control key for that address. Each eight byte line of the table gives the two-byte addresses by which four control keys are to be hooked up to four editing routines.

As it says in the manual, all you need to do to reconfigure the keyboard is swap the addresses around to be "under" the keys you would like. For example, if you would like the forward search key to be under F, for "find", as it is in the PLE, then you would move the search key address, 56 1D, from Z to F. Remember that the *keys* are going to stay in the same order, and the *addresses* (to routines) are going to be moved around to other locations in the matrix or table. Because many of the ESC key functions are related to their corresponding control key functions, I have found it easiest to change both tables for every key I switch.

The next question, of course, is how to move the addresses to another cell in the table. This step involves getting into the Monitor. If you followed my disk-snooping last month, it'll be a snap. If you didn't, rest assured that this is a *lot* simpler. Listed below are the steps to follow. What you are doing is patching your Apple PIE program by changing those addresses needed to reconfigure your program to be the way you want it to be. I would recommend starting by making another copy of your Apple PIE disk to work on.

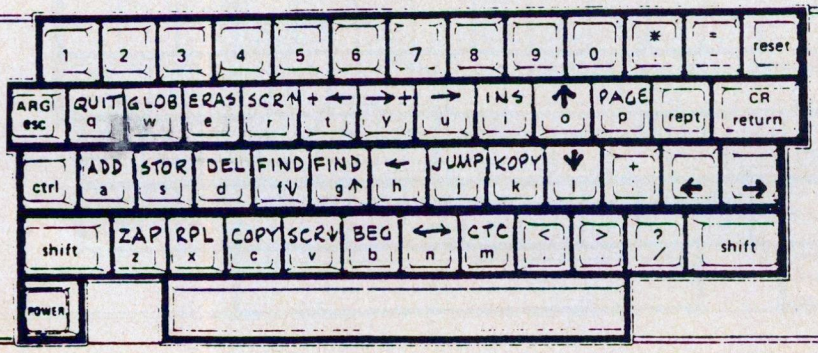
Figure 3

```
          @     A     B     C
1 2 A 0  16 19 14 1B 07 20 2D 24

          D     E     F     G
1 2 A 8  F3 18 C0 18 56 1D AC 1C

          H     I     J     K
1 2 B 0  EB 2B B5 1F 5F 1C D8 23

          L     M     N     O
1 2 B 8  CB 23 93 2C B3 19 B6 2B

          P     Q     R     S
1 2 C 0  36 19 8F 1B 65 23 D0 19

          T     U     V     W
1 2 C 8  88 20 D1 2B 0A 23 AF 25

          X     Y     Z    esc
1 2 D 0  C3 1E 82 1F F1 19 79 16

        n/a    ^M    ^N   n/a
1 2 D 8  87 14 C1 25 CE 25 87 14
```

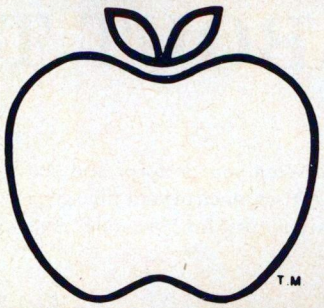
```
          @     A     B     C
1 2 E 2  16 19 B6 22 56 21 2D 24

          D     E     F     G
1 2 E A  A4 19 C0 18 56 1D AC 1C

          H     I     J     K
1 2 F 2  C4 21 B5 1F 5F 1C D8 23

          L     M     N     O
1 2 F A  EF 20 DF 1F 94 1A 2A 21

          P     Q     R     S
1 3 0 2  66 1B AF 1B 65 23 2E 22

          T     U     V     W
1 3 0 A  F4 21 B1 21 0A 23 AF 25

          X     Y     Z    esc
1 3 1 2  C3 1E D9 21 87 14 79 16

        n/a    ^M    ^N   n/a
1 3 1 A  87 14 C1 25 CE 25 87 14
```

PIE FUNCTION REFERENCE CHART (3)

tab left (T)
screen up (R)
erase char/BS (E)
global mode (W)
quit editor (Q)
find str, back (G)
find str, forward (F)
delete char (D)
store in buffer (S)
add line (A)
zap line (Z)
replace str (X)
copy from buffer (C)
screen down (V)



tab right (Y)
insert char (I)
cursor up (O)
page forward (P)
page back (@)
jump/goto (J)
kopy to buffer (K)
cursor down (L)
cursor left (←,H)
cursor right (→,U)
enter ctrl char (↑M)
end of line (N)
shft/shft lock (↑N)
begin pg/HOME (B)



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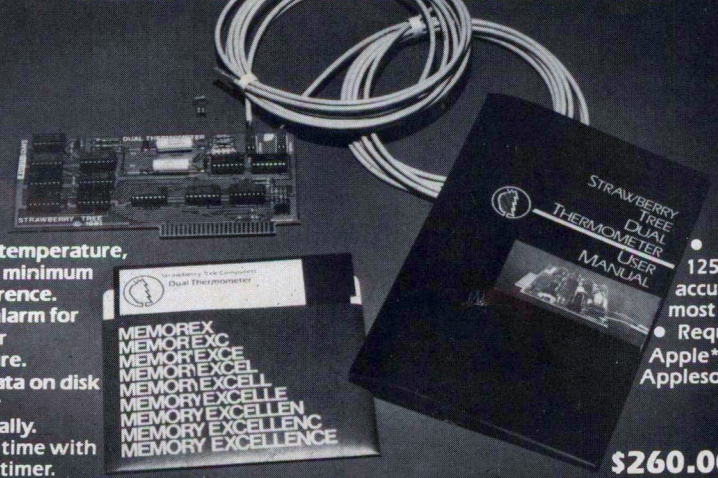

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NOTES FROM A NOVICE

Actually, all we are going to modify is one machine language file on the disk which is named, APPLE PIE. Note that the steps below are different from those in the manual. Use mine; they avoid a problem you will otherwise have with the Applesoft $0800 address. To be more specific, make sure you do your BLOAD and BSAVE commands when the monitor prompt (*) is on the screen, *not* the Applesoft prompt. Here are the steps:

1. Boot a disk with a "clean" (original) version of DOS on it and a simple Hello program (not PLE, for example).
2. Insert your Apple PIE disk in the drive, and type
3. **UNLOCK APPLE PIE [return]**
4. **CALL -151 [return]**

Now you're in the Monitor, and should have an asterisk for a prompt.

5. *** BLOAD APPLE PIE [return]**
   (Ignore the register numbers which suddenly appeared after the load.)
6. * patch, patch, patch ([returns] as needed)
7. ***BSAVE APPLE PIE, A$800, L$2B00 [return]**
8. **PR#6 [return]**

which will boot the disk, and bring up the Menu. Select #1 and try out your new keyboard. If for one reason or another, you need to try again, the surest procedure is to start over. Recopy the original APPLE PIE onto your work disk, and go back to step 1. When you get it the way you want it, type

9. **LOCK APPLE PIE**

That's all there is to it. Yeh I know, you want to know what "patch, patch, patch" means. I saved that as a kind of subroutine.

After step five, all you'll see on your screen is the Monitor's asterisk prompt printed below the results on steps 3 and 4. You now must list those addesses you want to change and then type in the new addresses; such changes are called patches because they're often used to fix a program that isn't working properly. And, as you might suspect, there is a proper way to enter a patch so that it will "take".

Let's continue our example, and change the address "under" CTRL—F to be the search forward routine, or address 56 1D. As indicated in Figure 1, CTRL—F is located at bytes $12AC & $12AD in the Apple PIE program. If you type

*** 12A7 [return]**

the Monitor will display what is stored in that location: 2B. If you then type

*** 12A8 [return]**

you will get the next eight bytes displayed, starting with 12A8. To alter what is stored at any location, the procedure is the same except a colon must be inserted after the address. Thus typing

*** 12AC: 56 1D [return]**

will place the search forward routine address, 56 1D, in the CTRL—F boxes, 12AC and 12AD, of the first table, and

***12EE: 56 1D [return]**

will do the same for the second table.

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If you now went on to step seven above, and BSAVE'd APPLE PIE properly, you would have a keyboard with the forward search routine under CTRL—F. You would also still have it under CTRL—Z, and you would not have a cursor-right move under CTRL—F. You can see what is involved. You need to plan ahead, lay out the tables on paper the way you want them, making sure all the commands are covered, and then enter all the patches at once. That is what is meant by "patch, patch, patch". You can, of course, enter both entire tables. If you do so, the first table starts at 12A0, and the second at 12E2. To begin, type

```
*12A0
```

followed by eight bytes (and a [return]), as shown on any of the Figures. Start each succeeding line with a colon, and end it with a 'return'. Ditto for the second table. I am going to leave it at that, except to say that there is a good chapter (#7) on the Monitor in the *Apple II User's Guide* by Lon Poole.

In case you want it all done for you, which is not the idea at all, I have included in Figures 2 and 3, two sets of COMMAND TABLES, of which I am reasonably proud. Figure 2 will give you a keyboard with the cursors under CTRL—I, J, K, and SHFT—M. The SHFT is necessary because the Apple reserves CTRL—M for "RETURN". The rest of the commands are distributed in ways which I thought were both logical and convenient. This keyboard is particularly useful if you do a lot of programming, and prefer having the cursors where Applesoft put them, as well as PLE's CTRL—D for character delete, CTRL—F for find, CTRL—N for end of line, etc. Chart 2 illustrates where most of the commands are for this set of tables.

Chart 3 goes with Figure 3 and is the keyboard I am currently using. It matches the hardware described earlier, as well as many of the control commands on the Pascal editor, PLE, and DB Master. The cursor moves are on the arrow keys, with up and down under CTRL—O, and CTRL—L. Because, with the Keyboard and Display Enhancer, I do not use the PIE shift key at all, I have hidden it under CTRL/SHFT—N. You might need to move it to some place more convenient. CTRL—A adds a line, CTRL—Z zaps one out, CTRL—S stores a line in the buffer, CTRL—K "kopies" it *into* the buffer, and CTRL—C copies it out. CTRL—P pages forward, and CTRL/SHFT—P pages back. CTRL—J jumps to the beginning of file, and ESC CTRL—J jumps to the end. CTRL—I inserts characters into a line and CTRL—D and CTRL—F delete and find as above. CTRL—Q quits the editor and goes back to the COMMAND prompt. If you're familiar with the Pascal editor and PLE, you'll recognize many similarities. There is more, but you should be able to figure it out from the chart and a little keyboard snooping on your own.

You can also compare addresses between tables to trace the migration of particular commands. Watch out for INS(ert) and DEL(ete) on Charts 2 and 3. In these arrangements, they refer to the insertion and deletion of characters, not lines, as in the original PIE tables. You might forget that, as I did, when you use those keys to split or join lines (ESC CTRL—A & ESC CTRL—S), or to insert or delete areas of the screen.

To keep from driving myself nuts while I'm learning a new keyboard, I put little tabs on the tops of the keys. But if your scheme is designed with good mnemonics and is similar to the command keyboards of other programs you are using, it should be easy to learn, at least that is the idea. Try it, you might like it.

Making Your Own PIE Pans

Another trick I use with PIE/FORMAT is to use the delete line key to set up blank forms. For example, I have a correspondence form saved on file which is essentially all FORMAT commands. When I want to write a letter, I just load the blank form into the editor, type in the date, address, greeting, and text. I might type the whole letter and never type a new FORMAT command. I'll check the commands already on the form to make sure they are appropriate, but by using the form, I don't have to remember how to set up a letter everytime I write one. If FORMAT is the crust for Apple PIE, then these blank forms are the pans that give FORMAT support and shape.

To make the blank correspondence form, I simply took one of my early, fully formatted letters and stripped all the text out of it with the delete line command (CTRL/SHFT—N on the original keyboard). I added small simple reminders like "date", "name", "address", "text", etc. which I type over when I start a letter. Then I saved it all to disk and now use it everytime I type a letter. Actually, I have three such forms for three different types of letters. I also have forms for articles, stationary headers, memos, cards, newsletters; you name it. It takes the pain out of remembering each time how to get FORMAT and my printer to cooperate. I only have to FORMAT something once; after that it's saved for reuse.

I keep all these two-sector blank forms on my PIE/FORMAT work disk. Then I develop one of them into a work file on the same disk until it's in final form, whereupon I transfer it to a data disk, back up the data disk, and remove the work file from my work disk. I just found out that the Pascal editor has a similar system all built into a very elegant filing system. So I think I'm on the right track.

Now for those of you who could care less about Apple PIE (very un-American), I've collected a few other confections.

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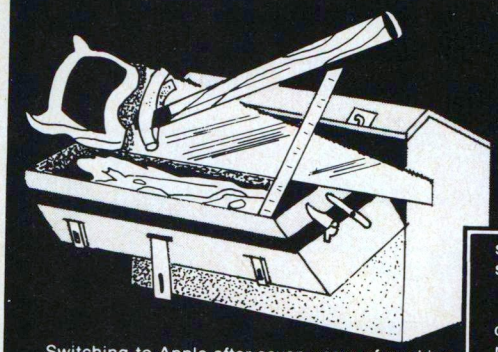

Switching to Apple after seven years of working with mini computers rapidly became a frustrating experience. We simply couldn't get at the data and programs that were stored on the disks at the level we had been used to.

SOMETHING MISSING

Like everyone else, we had access to plenty of "free" pass around programs, but there was always something missing. Either we couldn't do exactly what we wanted to do, there were errors in the programs or the lack of instructions and user orientation made the programs almost worthless. Even the utilities we were able to buy didn't have the quality and usability we wanted and needed.

TOTAL ACCESS

As a result we developed MASTERDISK for our programmer's use. At first we simply developed the ability to access and edit any byte of any sector on any disk we had. While this met our needs to deal with the data on the disk at the most basic level, we soon recognized that we had solved only part of the problem. We ran head on into the mysteries of DOS. Although the DOS manual gave us a lot of information to use to decode the contents of the various types of sectors, the process of understanding what each byte meant was tiresome. Since a computer is good at doing tiresome tasks we soon assigned it the task of decoding the data on the sectors.

USER ORIENTED

MASTERDISK became more and more user oriented. Access to all capabilities was set up on a menu basis. At all times the screen shows what options are available to the user. All of the standard sector formats are decoded and displayed in an understandable manner for the user. If a sector from the disk is of an unknown format you can display it as if it were each of the standard formats to see if any fit. Text can be displayed as it is stored and can be corrected directly if necessary. When the program displays byte data it also displays the ASCII equivalent on the same line. In addition other capabilities were added to the disk.

MORE FEATURES

There are many features of MASTERDISK that we believe makes it one of the best utilities of its kind available.

Sector Access and Edit: Every sector of the disk can be read, edited, and displayed in an understandable format.

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THE NEXT STEP

Working with our new utility soon led us further into DOS. We were soon looking at the control commands and error messages stored in DOS. Since we wanted to put security on our disks we wanted to control these parts of the operating system; MASTERDOS was the result. As before we let the computer do all of the hard work and provided the user with the ability to change commands, error messages and even the disk ID title through simple prompted screen displays. Not only does MASTERDOS allow you to change these key words and phrases it also shows you the standard, current, and revised values for them.

DISK SECURITY

Now anyone can rename key words so another user cannot get the programs to load, list or even to run. Error messages can be changed to confuse or entertain. You can put your name on all your disks at the top of every catalog or even change the greeting to a binary or an exec file.

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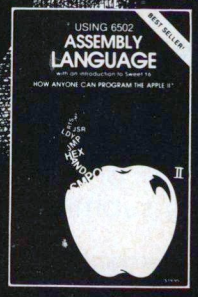

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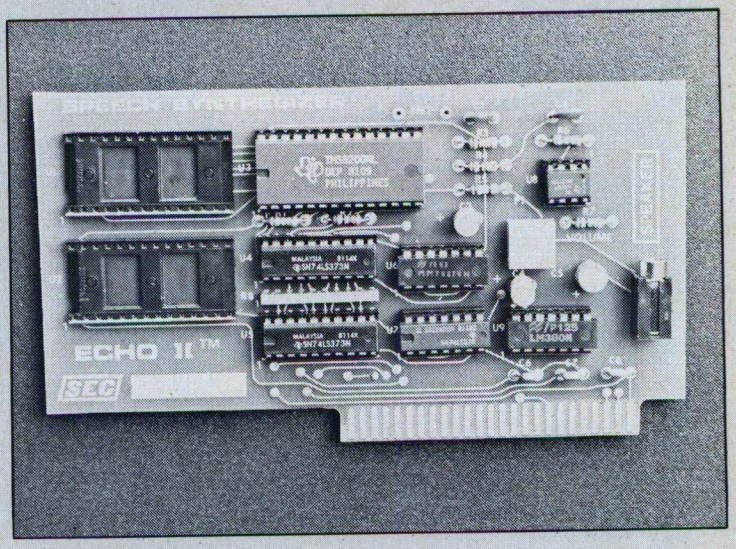

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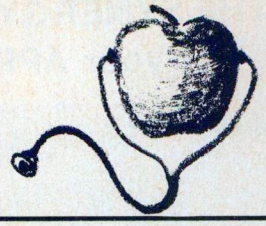

By Henry Roberts

AS I begin this edition of the APPLE DOCTOR, a couple of things bear mentioning. There is quite a delay between the time an article is written and the time you receive your CALL —A.P.P.L.E. I just received my September CALL —A.P.P.L.E. and the nybble copier part is already out of date.

I received a phone call about the RAM test mentioned in the August issue. The caller was confused, because his results appeared *very* different from those I described. He had set memory to all zeroes, and many of the locations contained such values as CA, CB, AB. What happened was the result of very slow memory. The individual memory cells could not take information as fast as the APPLE could supply. As a result, a large number of the cells were still held 'high' when they should have been brought to zero. The irregular pattern gave away the speed problem. The values like CA, were really the combination of several chips failing. The CA would indicate that the two left most chips had failed, along with second and fourth from the right. The CB indicates a failure of the rightmost chip as well. The AB shows a switch. The second chip from the left is O.K., but fourth from the left failed. In this case all of the upper 32 K chips had to be replaced.

QUESTION:

After two years of programming in BASIC on my Apple II (DOS 3.3) with fine results, I stumbled today on a phenomenon which astounds me.

I accidently wrote to a text file without opening it and noted that my textfile (sequential) took it!

Now, I have typed ?D$"OPEN FILE" a million times and yet I ran the enclosed programs and got what I wanted without an "OPEN". I did try it once without first having a file by that name on the disk and got the ole "FILE NOT FOUND" error, but when the file exists, it saws away.

On my read program, I even looped back to line 20 and it kept reading the file.

What gives?

ANSWER:

Congratulations! You just discovered another one of APPLE's undocumented operations. What you discovered is *not a bug* in DOS. It is *intentional* on the part of APPLE. One of the first things either a READ or a WRITE command does is jump to memory location $A764 (48K). The machine language code at this address looks for the already opened file buffer and if it can't find one it opens the file!

If you try this trick with a random access file, DOS will open it as a sequential file. A final word about DOS: it just sort of grew. Until last Christmas, there was never an assembly source listing of DOS. It was patched and repatched with the mini-assembler. Last Christmas, John Arkley at APPLE put DOS into assembly language source code. He was producing a copy protected version of DOS 3.3. With a history like that, it is a wonder there aren't more glitches and undocumented happenings.

QUESTION:

I have been using the APPLESOFT tool kit, manufactured by APPLE Computer, Inc., to generate high resolution characters for animation. This seems to work very well using their high resolution character generator. My problem is that when I finish the display, I would like to run another file on the same disk which will work better without the high resolution character generator. I am unable to leave the high resolution character generator by using any commands in the program. I need to press reset and then type FP and then run the next file. What I would like to know is whether there is some way to accomplish this using BASIC commands such as PEEKs or POKEs or whatever.

ANSWER:

Your problem centers around what some people call the page zero 'hooks'. These are really vectors which tell the computer what to do with output and where to find input. The character generator changes the output vector so that all output goes to the character generator.

To get back to the normal text mode use the following sequence of APPLESOFT commands

```
10 D$=CHR(4):REM IF YOU ALREADY
   DID THIS YOU DON'T HAVE TO
   DO IT AGAIN
20 PRINT D$;"PR#0"
30 X=PEEK (-16303): X=PEEK
   (-16300)
```

back to the text mode using the first text page.

QUESTION:

On page 79 of the APPLE DOS 3.3 manual we are told that EXECing a file during program execution will cause subsequent INPUT statements to take their responses from the EXEC file. Is there any way of circumventing this feature of the DOS? A few superfluous INPUTs or GETs following the EXEC command don't seem to work predictably. If there was some sort of input buffer counter to set to zero, this behavior of the DOS would be easy to side step.

ANSWER:

I don't know what your specific application is, but you'll probably have to divide your EXEC file into parts and intermix some regular INPUT and GET statements.

Basically, once you open *any* file, all INPUT and GET statements will take their data from the file rather than the keyboard. I checked the EXEC code, and while there is a buffer and a pointer, it is part of the file manager and changing it would cause no end of woes.

The only thing I know to do is use several EXEC files and insert the INPUT and GET statements between EXECuting the individual files.

QUESTION:

Possibly you or one of your associates could answer a query for me. I have a 48K APPLE with Integer Basic in ROM and I use RAM Applesoft. What can I do to make ampersand routines, such as DOS 3.3 renumber and DOS Toolkit, run on my APPLE?

I would appreciate any assistance you could give.

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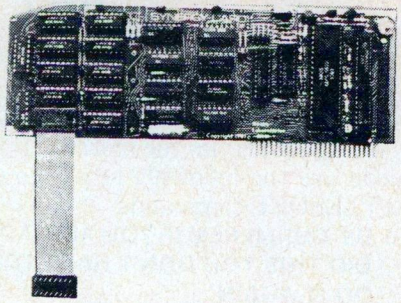

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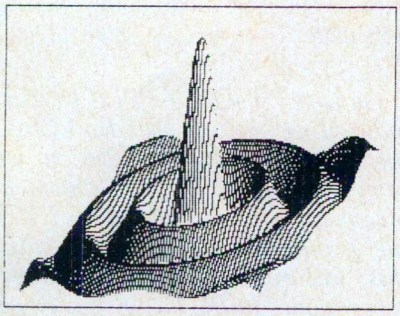

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A.P.P.L.E. DOCTOR

ANSWER:

If you are planning to use the renumber routine, read the next question and answer. It could save you a lot of grief! You can modify RAM Applesoft to use the ampersand command with a POKE 2142,244 and a POKE 2143,3. This sets RAM Applesoft up to use the command. Then POKE 1013,76, and 1014 and 1015 with the ampersand jump address required, low byte first.

QUESTION:

I need your help. I remember reading of a bug in Applesoft, but did not make a note of where it was (which article).

My problem is my FOR-NEXT loop in a subroutine — I get an error saying I have a NEXT without a FOR. This is not so. I use the same routine branched from another subroutine and everything is O.K.

Could you tell me the answer? This happened after I renumbered.

ANSWER:

There is a bug in Applesoft. I wish I could tell you it was in the FOR NEXT loop, but I can't. The bug involves the VAL function. In fact CALL—A.P.P.L.E. just recently reported a second bug in the VAL function.

Let's look at the problem from another angle. Did you have the problem *before* you renumbered? If you didn't have the problem before renumbering, did you add this call to the FOR NEXT routine after renumbering? There IS a bug in the renumbering routine. It results in numbers following a '*' being changed. If you did any computed jumps, the renumbering routine could be the culprit. I've watched the renumber routine blow a couple of my programs away. In each case, it took hours to make them work again. The bug and its fix are reported in the October CALL —A.P.P.LE., page 76.

It is easy to have a NEXT without a FOR error in Applesoft. APPLE did it in their PHONE LIST program. In the versions I have seen, this error occurs in the edit mode. If you ask to edit 'Jane Doe' and refuse the only entry, the programs bombs! If there are multiple entries by the same name, you must reject all of them to make the PHONE LIST bomb. Now that everybody has run to their computer to try this, I'll give my solution to their bug. Change lines 5050 to 5100 as follows:

```
5050 REM
     FIND AN EXACT MATCH
5060 RESTORE: READ Z: FOR I = 1 TO
     NR
5070 READ NA$: IF LEFT$ (NA$,LEN
     (K$)) = K$ THEN 5100
5075 IF LEFT$ (NA$,1) = CHR$ (92)
     AND I > = NR THEN 5070
5080 NEXT : HOME : GOTO 25000
5100 REM
     FOUND A MATCH
```

What happened with phone list may have happened in your program. The FOR NEXT loop may be perfect, but you jump into it *past* the FOR statement. In a program with lots of GOTOs, this is easy to do. That's why I asked if you used any computed GOTO's. It would be easy for one of them to be changed in such a way as to branch to the middle of the loop.

QUESTION:

Do you have a dose of physik or perhaps a recommendation for a set of leeches to apply to my DOS 3.3 to cure it of a pernicious disease? I have an external terminal (a heathkit H-19) which couples to a 48K APPLE II via a SSM AIO board. They all work fine as advertised when I connect the external terminal up via the usual PR#3 and In#3 commands. MY programs run well, the terminal gives me a wide-screen view and wide key range interaction.

But everything goes to worms when my programs try to print-out on the printer by issuing a PR#1 command. Then the output to the terminal disappears, only to be returned to the terminal if I patch in a PR#3 statement to replace the PR#0.

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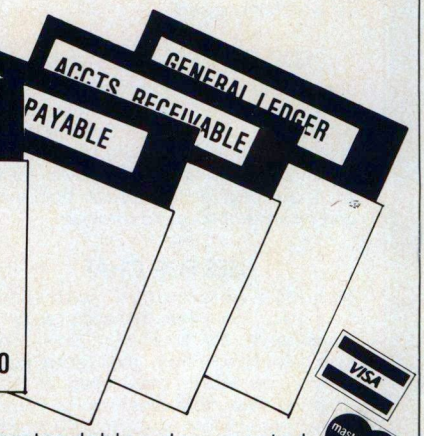

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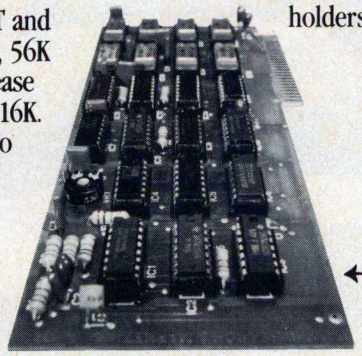

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A.P.P.L.E. DOCTOR

Is there any way I can patch DOS so that DOS knows to set the output and input from a particular slot when reset and to maintain it through thunder, lightning, brown-outs, print-outs etc? A dose of physyk patches for DOS would be appreciated by me and any one else out there who tries to use an external terminal routinely with BASIC.

Yours until Apples get eaten by Med flys.

ANSWER:

I don't know of any 18th century medicine which will help your APPLE, this includes laxatives and blood letting. As far as the thunder, lightening, and brown-outs are concerned, I can only suggest a portable generator. Other members of the family might find that smelly as well as noisy. That was the bad news. The good news is that we might be able to redefine the 'PR#0' command.

You didn't say what type of printer and interface you were using. Frequently, a PR#1 command will cause output to no longer be shown on the screen. The PR# commands take the output and shift them to slots 1 - 7. The PR#0 command returns output not to slot 0, but to the video screen. Sometimes, an interface/printer combination will echo the printed output to the APPLE video screen. My Heath printer/SSM interface is of this type. This would account for video disappearing from a terminal connected to slot #3. Even if the output was echoed to the APPLE video screen, you would not see it.

The trick is to cause DOS to change the PR#0 command to a PR#3. Reset will still return video output to the APPLE monitor, even if an autostart monitor ROM is used. This is because the keyboard and print vectors are reset *before* control is passed to the user's routines.

To modify the PR#0 command you must patch DOS. The easiest way to do this is to remove a few of the 32 and 48K RAMS. This leaves a 16K APPLE. Boot a master diskette and go into the monitor with a CALL —151. Make your DOS patches and initialize one or more diskettes. *These freshly initialized diskettes will themselves be master diskettes!* The following patch to DOS will cause any PR#0 command to send all output to slot #3. Other slot numbers will be unaffected.

```
A22B— 4C 33 A2 JMP $A233
A22E  NO CHANGE
A230  NO CHANGE
A233— F0 03    BEQ $A238
A235— 18       CLC
A236— 69 03    ADC #$03
```

Placing the patch here will disable the MON command. Locations A22E and A230 contain the code for the IN# command. If you wish to locate the patch elsewhere, change the JMP address at A22B to point to the new address. The patch itself is fully relocatable.

There were more questions than space this time. Remember there is a several month delay between my writing a column and the time it actually goes to press. Those questions which I can't answer will be forwarded to someone more knowledgeable. I assume any query which is accompanied by a stamped, self addressed envelope will receive a copy of my answer as it appears in Call —A.P.P.L.E.

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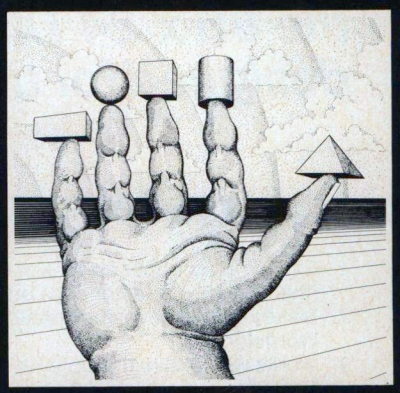

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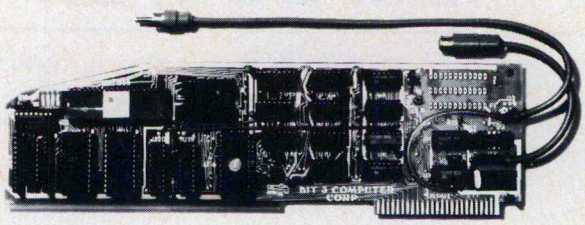

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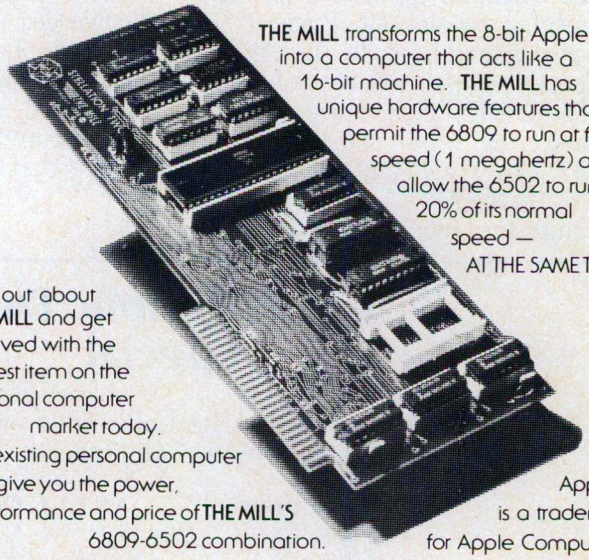

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A CALL —A.P.P.L.E. BOOK REVIEW

By Val J. Golding

What's Where in the Apple
(An Atlas to the Apple Computer)
by William F. Luebbert — *128pp*

MICRO INK, inc. — *$14.95*
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YOU may wonder: do we only review those books we plan to sell, and the answer is, of course, no. The fact is, quite often we read a book that we plan to review, and it turns out to be of such a level we can't resist the opportunity to make arrangements to make it available to our members. This was precisely the case when we picked up a copy of "What's Where." In fact, we had previously had some contact with Prof. Luebbert, traded information back and forth, etc., thus we have been anticipating this publication for quite some time.

"What's Where in the Apple" is an 8½ x 11 spiral bound reference manual that can be of help to almost every programmer, and surprisingly, particularly BASIC programmers. It consists of an eight page users manual, which contains an overview of Apple memory organization in an ascending [memory page] order, plus some examples of how to use the information in the book in user programs.

The balance of the book is evenly divided into an "Atlas" and a "Gazetteer," the contents of which are photo-reproduced from a main-frame computer print-out on which Prof. Luebbert has stored his data base. Both of these computer produced sections are in all upper case and somewhat difficult to read at times, but the information is the important thing here. Each entry describes a single (sometimes two) memory location(s). The address is given in decimal and hexadecimal, and (if applicable) the name of the symbolic label, followed by a brief explanation of the routine which resides there.

The Atlas and the Gazetteer differ only in their organization: the contents of the Atlas are in numeric order, while the Gazetteer entries are sorted alphabetically by label, providing a complete cross-reference of Apple memory locations.

An appropriate sub-title for this monumental work might have been something like: "A Dictionary of PEEKs and POKEs," for that is exactly what it is, under one set of covers, most of the important memory locations in the Apple. When you see an unknown POKE somewhere in a program, here is where you can go to look it up and find out what makes the Apple tick.

In a work of this stature, one could reasonably expect to find a handful of technical errors, and indeed there were a few. However in terms of the amount of research that must have gone into the collection and preparation of this material, and the extent of the material itself, the percentage of errors dwindles to a completely insignificant figure. Moreover, a fair amount of the errors are errors of omission, and not inaccuracy.

So here it is. If you already have "The Apple Monitors Peeled" and "All About Applesoft," and have a thirst for more, or, if you just want to fnd the locations of those fleeting POKEs, look no further.

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AMPERGRAPH uses the Applesoft ampersand machine language jump vector to link to a relocatable 9K routine which normally resides above the second high-resolution graphics page in the Apple II. The system requires an Apple II Plus (or Apple II with language card) with 48K and DOS 3.3.

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MAE MACRO ASSEMBLER:

EASTERN HOUSE RESPONDS

By Don Earnhardt

IN regard to Mr. Jonathan M. Levine's review of Apple macro assemblers, we feel that a rebuttal is required. It appears to us that there is some bias in this review and that our MAE package has been somewhat short changed. The remainder of this letter addresses the specifics of our rebuttal.

1. Your review stated that the MAE "took HIMEM." I am not quite sure what you mean by this. If you mean that it requires a lot of memory, this is true. But, according to your review of the MAE, it provides only 18K of user space (I presume that this is from $800 to $4FFF). However, the space from $7D00 to $9600 (the bottom of DOS) is also available.

2. You said that the MAE allowed use of memory from $800 to $4FFF. That is true, but all memory between $7D00 and DOS is also available. The SET command allows one to move the text and label files to any desired location in the free areas.

3. The review stated that it is impossible to delete or insert characters in the edit mode. This is simply not true. The EDIT form 2 command (ED followed by a line number) prints the desired line and places the curser at the beginning of the line. The standard Apple editing features (ESC I,J,K,M) may then be used along with the curser arrow keys to edit the line. This is the standard method of editing all Apple Basic lines. Refer to the Apple users manual for details.

4. You felt that the Big Mac was easy to use because the commands are mnemonic. If you define "mnemonic" in the same way as Webster's dictionary "....aids to help in remembering," then MAE commands are also mnemonic.

CO = copy	FI = find
MO = move	AU = auto line numbering
ED = edit	NU = line renumbering
GE = get file from disk	PU = put file to disk

5. You stated that MAE does not support lower case. This is not true. Very simple patches are included to allow use of the M&R Sup"R"term card. This allows 80 columns as well as lower case. We use this card and it works quite well (this letter was composed using the MAE, the STP word processor included in the MAE package, and the Sup"R"term card). Additionally, these patches may be used for any lower case adapter available for the Apple. And finally, a lower case provision is included which allows lower case characters to be processed through the STP word processor even if the user does not have a lower-case adapter.

6. "The MAE uses a strange protocol to load its files" —This protocol was developed to prevent the user from loading a file larger than allocated text file space. The user, after receiving an error message, can reallocate the text file space and reload the file, thus avoiding accidental crashing of the system.

7. "The text area is so small (8K) it is impossible to fit any program that really needed all MAE's features into one file." A further review of the manual will show that the SET command can be used to reallocate the text file space for a larger program as previously described. Additionally, *any* size program may be assembled by the MAE by using a Control File and as many source files as there is room on the disks. There is no limit to the size of a program which can be assembled by the MAE. We have many customers for this assembler and not one has complained about the lack of text file space.

8. "MAE uses nonstandard format in pseudo-ops" -Who set the standard? What assembler, other than the MAE is available in similar format and syntax for Apple, Atari, Pet, KIM, SYM, AIM and other 6502-based computers? If Mr. Levine is refering to MOS Technology's original assembler specifications, he would find that there are only about six pseudo ops specified. MAE has 26, and Big Mac 22. The Big Mac must also be nonstandard since it has more than the MOS Technolgy specification.

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9. "* before all zero-page references" -Now this is a controversial item. We could have modified the MAE to automatically adjust for zero-page addresses, no big deal. But we prefer to have as much control over the generated object code as possible. MAE users are about evenly split on the use of the * -some like it, some don't. Some of them didn't like it initially but later decided that they did like it. We think that Mr. Levine took an unnecessary potshot at the MAE in stating that "it seems silly that a $170 assembler can't recognize zero page."

10. "last drawback to MAE is that error messages are in hex" -It doesn't take long to learn the error codes, some errors are so obvious that anyone but an out-and-out novice can recognize the error by a quick scan of the line. We even listed the error codes on the back of the manual for quick reference. And how about the resolution of errors -MAE had 39, ALD has 4, and Big Mac has 10. If you ever have an unobvious problem, it is obvious that the MAE can pin-point the problem with more resolution than the other two assemblers. One final point, the hex numbers require far less memory space than English text. Even Mr. Levine concedes that you "eventually learn a !07 means no end error." Mr. Levine rates all three assembler "fair" in regard to error messages, but he seems to enjoy downgrading the MAE for its use of hex error codes.

11. "almost impossible to convert files" from one assemblers format to the MAE format. "I attempted it this summer when I was converting WP6502 to run on the Apple, and after a week we gave up." We have converted several other assembler formatted files to MAE. In fact, the Pet MAE users have written a simple Basic program that does this automatically.

12. "The biggest problem with Big Mac though, is the fact that it cannot link files. When the Language Card version is out, it will do this....." Mr. Levine seems biased toward the Big Mac because he likes to make qualifications for its short comings. But at the same time, he failed to mention that the MAE has the capability to link files!

13. "support programs allow for greater use of the assembler..." Mr. Levine mentions that the MAE has an "acceptable word processor," and casually mentions that it has a relocating loader, serial printer driver (UART program), and macro files. He likes to use embellishing words for the Big Mac -"Big Mac comes with an incredible amount of support ...."

14. In the comparison table, Mr. Levine includes an entry "Ease of disk access." He mentions that MAE sends disk commands via the EDIT command. If he were as familiar with the MAE as he thinks he is, he would have listed the DC command (for disk command) in his table. He also made no mention in his text that the Big Mac required an exit to the EXEC mode for disk commands. It appears to us that both the MAE and the ALD excelled here over the Big Mac. Mr. Levine chose to ignore this difference.

Listed below are a few items that we feel could have been mentioned to show some of the areas where the MAE excells over the other assemblers.

1. The MAE can "chain" or "link" source files together with the only limitation being the amount of data stored on the disk. This same feature also applies to files to be printed via the word processor. Do other assemblers provide this feature?

2. The MAE allows the programmer to use labels up to 31 characters in length. The ALD allows 7 and the Big Mac allows 13.

3. The MAE supports lower case and 80-column cards. Do the others?

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4. MAE provides relocatable object code and a relocating loader which allows the code to be loaded and executed anywhere in memory. Do the others provide relocatable object code?

5. The MAE user can allocate text and symbol table memory areas using a single command. Do the others provide this feature?

6. We feel that MAE is the standard. What other assembler is available with similar syntax for all major 6502 computer? Our assembler is available in similar syntax and pseudo-ops for Apple, Pet, Atari, KIM, SYM, and AIM. We also provide an unconfigured version for homebrew 6502 systems.

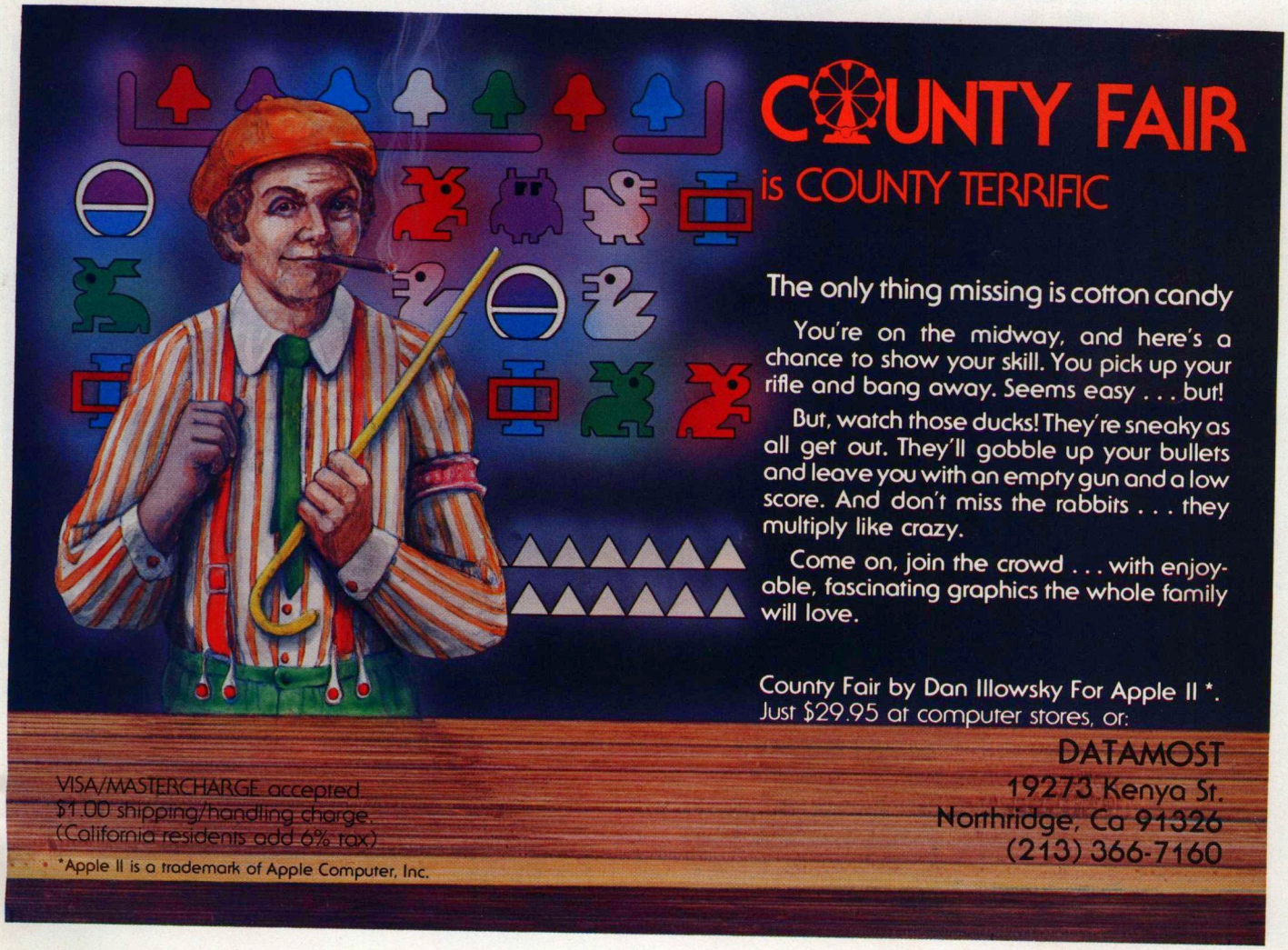
7. MAE uses variable length symbol table records to conserve memory. Thus a label requires memory in the symbol table based on the length of the label plus three bytes. Other assemblers set asside a fixed amount for each label no matter how long the label is -thereby wasting memory.

8. What about automatic formatting -the user must only insert a single space between each of the fields. The MAE formats the text correctly during a raw printout or during an assembly listing.

9. The MAE contains a string search and replace editing feature and a string search and conditional replace. The user is queried to determine if each occurrence of the string should be changed.

10. MAE has a line length of 80 characters while Mr. Levine lists the Big Mac as being limited to a total of 64 characters per line. This should have been mentioned as an advantage since 80 character line lengths are standard for printers and enhanced CRT displays.

11. Where can you find a full-featured macro assembler with relocatable object code, relocating loader, *and* a full-featured word processor for $170. The MAE provides all of these features plus compatibility.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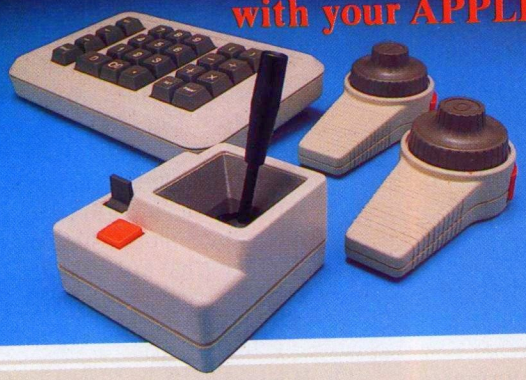

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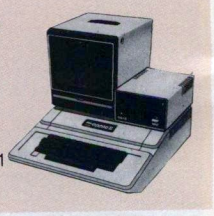

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POINTERS ON POINTERS

By John Rodger

FIRST of all, why should we wish to relocate an Applesoft program?. One reason might be that we wish to use graphics pages HGR or HGR2 and our programs or variables are running into the same space. As soon as we enter graphics mode, this code is overwritten. We therefore place our program above HGR (decimal locn 16384) or above HGR2 (decimal locn 24576). Some users never use the graphics capabilities, however relocation may still be necessary in the following circumstances. Many useful utilities are written in machine code starting at around location 2048 (HEX $800), for example FID, MUFFIN, UPDATE, HIGHER TEXT etc. These utilities would be compatible with Integer Basic programs, but not with Applesoft, and we need to relocate our program to sit above these routines.

In order to set up your program "almost" wherever you choose you could enter the monitor and change addresses $67 and $68, then return to BASIC and load/run your BASIC program. Alternatively you could keep on your disk the following short program to do it for you.

```
100 REM PROGRAM RELOCATOR
110 HOME : VTAB 10 : HTAB 5
120 INPUT "START LOCATION DEC
    ";A
130 INPUT "NAME OF PROGRAM TO
    RUN ";N$
140 H% = A/256:L% = A — H% * 256
150 POKE 103,L%:POKE 104,H%:
    POKE A — 1,0
160 PRINT CHR$(4); "RUN";N$
```

It is good practice to make your relocated BASIC program exit via the following completion routine.

```
63999 PRINT CHR$(4);"FP"
```

This resets program pointers to normal.

1). The Self Relocating Program

Now for a neat little dodge to get the program to relocate itself. One way that is often used to do this is with the &LOMEM: utility, as used by several commercial programs, e.g. HIGHER TEXT. This requires you to have a 160 byte machine code routine sitting on the same disk which must be loaded and executed at the beginning of your program. Apart from using up two sectors, you have to remember to include it on every disc with your program.

The same thing can be easily accomplished without any extra programs by including the following few lines at the beginning of your program.

```
10 A =16384:N$ = "PROGRAM NAME"
20 H% = A / 256:L% = A — H% *256
30 IF PEEK (103) = L% AND PEEK)
   (104) =H% THEN 100
40 POKE 103,L%: POKE 104,H%:
   POKE A — 1,0
50 PRINT CHR$(4);"RUN";N$

100 REM REST OF YOUR PROGRAM
```

Note: A will be your required start location and "PROGRAM NAME" will be the name to save the whole program under.

2). How to Delete Lines and Keep Running

The BASIC statement

```
300 DEL 100,200
```

can be included in your program, but the program will terminate execution immediately after deleting these lines. In order to prevent this, we can use our old friends the program pointers again together with two new pointers, the CURRENT LINE POINTERS. Insert the following line anywhere in your program and all line numbers up to this point will be *effectively* deleted. The program will continue to run.

```
1600 POKE 103, PEEK (121) + 1: POKE
     104, PEEK (122)
```

If you halt your program and list it the first line will now be 1600 (if you inserted above line at 1600)

3). Prevent Unnecessary BLOAD's

Using the above technique, we can prevent binary files which have already been loaded from being reloaded when we rerun the program in memory.

```
100 PRINT CHR$(4);"BLOAD
    BINARY FILE1"
110 POKE 103, PEEK (121) + 1: POKE
    104, PEEK (122)
120 REM REST OF PROGRAM
```

Similarly, if you wish to display instructions or copyright notices when a program is first run, but not when rerun in memory, then use the same technique.

Example

```
100 HOME:VTAB12:PRINT
    "A.P.P.L.E. IS A WORTHWHILE
    ORGANIZATION"
110 FORS=1 TO 2000:NEXT S
120 POKE 103, PEEK(121)+1: POKE
    104, PEEK (122)
130 HOME:VTAB12:PRINT"CALL
    A.P.P.L.E. IS AN INTERESTING
    MAGAZINE"
```

Run the above program twice.

4). How to Speed Up a Program

We can use this idea still further to make frequently executed routines work at maximum speed. Because of the way Applesoft uses linked lists, a GOTO 20000 in a program with 20000 line numbers will take considerably longer than a GOTO 2. For this reason many programmers put frequently used routines at the beginning of their programs. This unfortunately makes it difficult for others to read. (That's the idea, I hear you say. Wait till you try to modify your own programs months later!!).

All you need to do is insert the routine as in line 1600 above, at the beginning of your routine, wherever it is, and any GOTO's within this routine will be executed at maximum speed. When the routine is complete, we must set locations 103 and 104 back to normal before continuing.

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A.P.P.L.E. MEETING MINUTES

By David A. Lingwood/Secretary

October 20, 1981
A.P.P.L.E. Offices, Renton

WITH a packed house of over 140 members and guests attracted by *THE WOZ!*, President Dick Hubert called the meeting to order at 7:35PM. Modern electronics (and Director Jeff Smith) allowed us to give the overflow late-comers in the office a view of the proceedings through closed-circuit TV, while taping the whole show.

Old Business:

Minutes for the July meeting were approved as published in the September *Call-A.P.P.L.E.*

New Business:

A comment, in view of the number of attendees, that the Puget Power Auditorium might be available for similar large meetings in the future.

The report from Treasurer Bob Clardy showed September receipts of $92,665 and expenses of $93,372, with $125K banked, $50K in receivables, and $10K in payables.

The business meeting was adjourned, in anticipatory haste, at 7:42PM.

Q&A

With few wanting to keep Woz waiting to learn how their Reset switch works, the Q&A session was also brief. An answer on how to do disk drive maintenance suggested that light sewing machine oil could be used on the sliding head shaft, but there was no *definite* information. The addresses for BLOADs were given: $AA72-3 for load point, $AA60-1 for length. The use of "S" file types for illicit purposes will bomb FID and Muffin. Enough of *this*, on to Woz:

The Woz

In introducing a famous scientist, a chairman once uttered the non-sequitur (unless he was a contortionist) that sums up well the feeling of the evening: "Tonight we have the honor to meet, face to face, the giant on whose shoulders we stand." You don't expect the co-creator of the Apple][to look like, well, a Berkeley student. He does (and is). It is also somewhat time-wrenching to hear a young man speak of ancient — in the accelerated time span of micro-electronics — history: the development of the Apple][during the mid and late '70s.

Steve Wozniak, the Woz, began with the nefarious activities that prepared *him* for this task: the sixth grade ham and electronics fan who grew into the college student who ran a dial-a-joke network, and built telephone blue boxes and pong and breakout hardware, while meantime making a living designing minis and calculator chips at Hewlett-Packard. His coverage of these moderately-bonkers years revealed the fun and curiosity that must have been essential for someone who soon would do the obviously impossible.

About the time the MITS computer came out, he began working on a small video terminal and monitor. Then, late '75, the homebrew computer club in the Bay area piqued his interest in expanding the terminal design into a full computer. The then-reigning 8080 chips were expensive, but the new 6502 was cheap. So now we know. The result was the Apple I.

He wrote Integer Basic to run on the Apple I, in *machine language*. The mini-assembler had not yet been created. Neither had the cassette interface. Before each demo at the club or elsewhere, they had the job of keying in the hex code for the BASIC by hand!

Co-conspirator Steve Jobs pushed the by then fledgling company to sell Apple I boards at the club for $40 each. Pooling their resources from the sale of an HP calculator and a van, and after talking a local computer store into handling the I's bare board, they set up shop and sold 175.

The Apple][was developed three months later. The problem, however, was how to finance the production run of 1,000][’s. Steve Jobs found Mike Markkula for venture capital, and Mike then decided to join the effort full time. The][was shown at the West Coast Computer Faire, and the rest is, as they say, history.

The][and its marketing were aimed at the hobbyist, though they saw a high likelihood for business use. They thought the][would last maybe six months before the competition caught up. Well, you can't be right *all* the time.

The Apple /// was designed at the higher end for business, including a substantial software package. Production and reliability bugs now behind, that package is now near complete with Pascal and (ah ha!) AppleWriter ///. Woz feels the /// is "just about to turn the corner."

Even though some had heard the story before, it was a definite pleasure having Mecca journey to us again to tell it once more.

November 18, 1981
A.P.P.L.E. Offices, Renton

President Dick Hubert called the meeting to order at 7:45PM. There were 60 members and guests present. The minutes were taken by "volunteer" Charlie Stillman, while the Secretary was out collecting the speaker at the airport.

Nominations of Officers:

Bob Huelsdonk reported that nominations for officers will be accepted until and at the December meeting.

Old Business:

A report on the computer fair at the Pacific Science Center: About 30 members attended. We had a booth with demo machines, and sold public domain software. A suggestion was made that next year we produce good demos, with better lead time.

A.P.P.L.E. MEETING MINUTES

New Business:

Last month we spent $30K more than we took in. *Call-A.P.P.L.E.*'s move to 12 issues a year, and increased dues and advertising rates should help keep this from becoming a trend.

The business meeting was adjourned at 7:52PM.

Q&A

Lifeboat Associates has hard disk CP/M for the Apple][; Corvus is working on one. "Illegal Direct Error" may be prevented by having program get input from the keyboard before the ensuing DOS command. Various other trivia.

Public domain software disks 45 and 144 will be demonstrated at the next meeting. This will become a regular feature.

Guest Speaker

The speaker for the evening was Harry Harper, President of Zofarry Enterprises, of Australia, creator of the Zofarry 80 column card. This card is now going on the U.S. market under the name "Vision-80," and marketed by Vista.

Harry talked about the trials that led to the creation of the product, particularly the struggles to keep the device faithful to the standard Apple protocols while at the same time supporting all screen functions and telecommunications. The Vision-80 card demo showed an 80x24 screen that responds to all screen commands in BASIC, CP/M and Pascal, with upper and lower case using the shift key.

The board also contains complete terminal firmware that permits uploading and downloading DOS text files to/from a host computer. Automatic logon files are also supported. A communications demo was run (hurriedly), linking the Apple][through Telenet to the teleconferencing program at the University of Michigan. This was done at 1200 baud, using a Vadic 3451 modem gratiously loaned to us by Rush Drake Associates, Seattle.

WRITING THE WRONGS

Dear Val:

This is to convey thanks for publishing Dana Schwartz's HUFFIN program in the Oct., 1981 issue. It's a valuable program, with much useful information implicit in its lines, for those with time to study it. However, it also has a bug, which may be a relic of some earlier version of the program. Anyway the problem arises when running the program with two disk drives.

As published, the program runs properly on a single drive, or on more than one drive, *if* the "target" disk is in the boot drive (or the last one accessed by DOS). However, if you specify a different drive for the "target" disk, the program still tries to write the DOS textfile to the last active drive.

The reason is that the program specifies the target drive number into the program's IOB — but DOS doesn't use that IOB, only the program's own RWTS routine recognizes it. Thus, when the "OPEN" command in line 320 is executed, DOS tries to open a file on whichever drive was last active for DOS.

As I remarked above, this may be a relic from an earlier version that used the RWTS routine for both input and output. The published version, in any case, uses the RWTS routine only for input from the Pascal source disk. For output it uses normal DOS commands. Therefore, the fix is quite easy: First change line 260 to

```
260S = SS * 16: IF SS = TS * 16 AND
  SD = TD THEN DR = 1
```

*(No need to multiply the target slot number by 16 — it will be used in a normal DOS command — but note that TS * 16 is used in the comparison to see if the same drive was specified for both)*

Next, change line 320 to read:

```
320A$ = " ":PRINT CHR$(4)"OPEN-
  "N$",S"TS",D"TD: D$ = CHR$(4):
  PRINT D$"MONO"
```

These two changes are enough to get the program working with two drives. Three other changes are possible, but not necessary. In line 430, the statement "PA = 1," and the two POKEs are not needed. PA is never used in any other line, and the program's IOB is set up in line 270 and doesn't need to be changed after that. In line 440, the statement "PA = 0" is also superfluous. Finally, in line 2070, the two POKEs are unnecessary (and, indeed, undesirable). *Note, however, that the POKEs should not be deleted from line 430 unless they are also deleted from line 2070.*

David W. Walker
16 Rockland St.
Wellesley Hills, MA 02181

APPRECIATE THE CORRECTION, Dave, our two drives are in different slots, so we didn't have a drive 2 to test with. (sloppy?)

BYTES FROM A.P.P.L.E. (continued from pg. 7)

We have had a good response to our newest product, the **Disk Bank** from our local members, but word of this neat item has not yet spread. The Disk Bank is a sliding drawer diskette storage cabinet that allows you to "reconfigure" the drawer to your own needs. It is made of hard, durable plastic, and is molded to provide n-level stacking. Each Disk Bank can hold up to 20 diskettes, and the price is two for $15. To make a special out of this, we'll fill it with ten of your choice of our **Public Domain** diskettes ($4 each), and ship the whole mess to you for $47.50, which is a discount of $7.50. Order the **Disk Bank/Public Domain Special.** If you do not have a list of Public Domain titles (and there are about 200 of them), send a self-addressed envelope with .37 postage.

Remember, all of our February specials must be postmarked or phone ordered by February 28, 1982. You may use your Visa or Master Card for either phone or mail orders, and a handy order form appears ont the last page.

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We have added a new publication to our collection: it is *William Luebbert's* **What's Where in the Apple,** a complete atlas of Apple memory locations, cross-indexed numerically and by symbolic label. A review appears elsewhere in this issue, and the member price is $12.50. It should be available by February 1st or before.

A final item of interest: **Diskpak 12** has been extensively modified, and all programs will now run on either an Apple][or an Apple][Plus. It is a collection of nearly 40 games, color demos etc., and a neat way to build up your software collection. It sells for $16.50.

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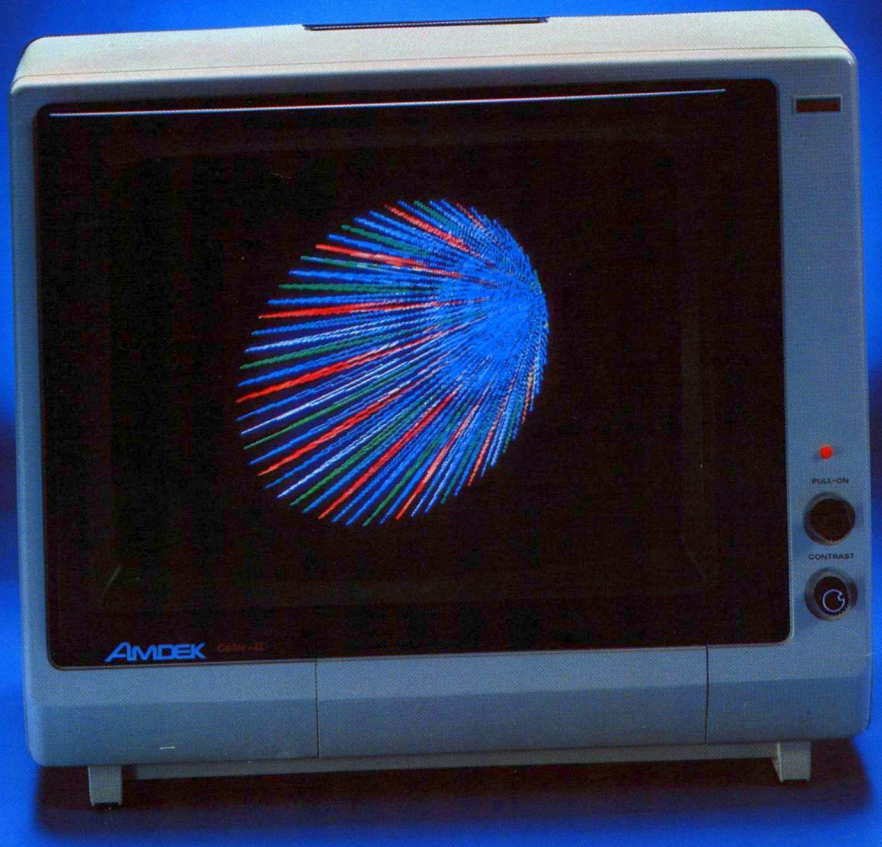

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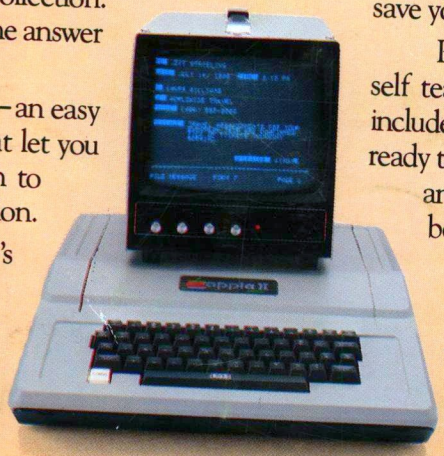

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